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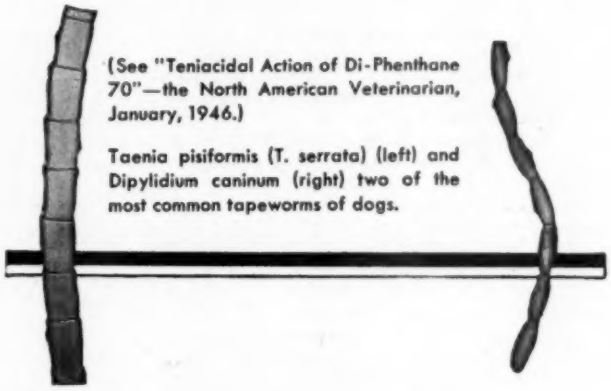

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VOL. CVIII APRIL, 1946 NO. 829

# Penicillin Dosage and Blood Levels for Horses

E. R. DOLL, D.V.M., and W.W. DIMOCK, D.V.M.
*Lexington, Kentucky*

FOR EFFECTIVE use of penicillin in treatment of bacterial infections, knowledge of the penicillin sensitivity of the infecting organism and of adequate dosage is essential. The objective to be attained in dosage is the continuous maintenance of the blood level of penicillin at or above the inhibition point for the organism involved. If the resistance of the infecting organism, measured in units of the drug per cubic centimeter, is considerably higher than the practical therapeutic blood level, penicillin cannot be expected to combat the infection successfully. In consideration of these points, a study was made to determine the sensitivity to penicillin of several strains of bacteria commonly isolated from infectious diseases of horses and to determine blood-serum levels resulting from different doses of penicillin.* *The dosage is given in units per pound of body weight.*

## METHODS

The *in vitro* sensitivity of the various organisms to the action of penicillin was determined by streaking agar plates containing known units per cubic centimeter of the drug. *Corynebacterium equi* and *Shigella equirulis* (*Bacterium viscosum equi*) were tested on plain, meat-infusion agar. For streptococci, 10 per cent of sterile defibrinated blood was added to tryptose agar. The inoculum consisted of one 2.5 mm. loop of a 1 to 10 dilution of a 24-hour broth culture for the streptococci. For *C. equi* and *S. equirulis* a suspension of organisms from a 24-hour agar slant was used. Six or eight cultures were tested on each plate and the readings were made after twenty-four hours incubation at 37 C.

TABLE I—Typical Results of a Blood Serum Determination for Penicillin

| | Control | | Serum | |
|---|---|---|---|---|
| Tube No. | Units penicillin in tube | End point in test | Dilution | End point in test |
| 1 ..... | 1.25 | — | 1-1 | — |
| 2 ..... | 0.625 | — | 1-2 | — |
| 3 ..... | 0.3125 | — | 1-4 | — |
| 4 ..... | 0.1562 | — | 1-8 | — |
| 5 ..... | 0.0781 | — | 1-16 | — |
| 6 ..... | 0.0390 | — | 1-32 | —* |
| 7 ..... | 0.0195 | — | 1-64 | + |
| 8 ..... | 0.0097 | —* | 1-128 | ++ |
| 9 ..... | 0.0048 | + | 1-256 | ++ |
| 10 ..... | 0.0024 | ++ | 1-512 | ++ |

*End point tubes in control and serum series.
Units cc. of serum = control end point × the dilution factor of the serum end point × e. g. 0.0097 × 32 = 0.3104 × 2 = 0.6208 units of penicillin per cc. of serum.
\+ Hemolysis with no visible growth.
++ Hemolysis and abundant growth.

To determine the amount of penicillin in the blood serum, a modification of the method of Rammelkamp[1] was used. The control consisted of a series of ten small tubes containing 0.5 cc. of tryptose broth which contained 0.05 per cent dextrose. The broth was pipetted into the tubes before sterilization. To the first tube of the series, 0.5 cc. of a solution of penicillin in saline containing 5 units per cubic centimeter was added, and serial transfers of 0.5 cc. were then made from the first tube through the remaining nine tubes. The serum test consisted of a ten-tube series of which the first tube was

The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the director.

Dr. Dimock is professor of veterinary science and head of the Department of Animal Pathology, University of Kentucky; Dr. Doll is assistant pathologist in the same department of the University.

*The penicillin for this investigation was supplied through courtesy of Merck and Company, Inc., Rahway, New Jersey.

a blank, and the remaining nine contained 0.5 cc. of broth prepared in the same way as for the controls. To each of the first two tubes, 0.5 cc. of the serum to be tested was added. Serial transfers were then made from the second tube through the series.

After the dilutions of the control and serum were prepared, 0.5 cc. of inoculum was added to each tube. The inoculum consisted of $10^{-5}$ dilution of a 24-hour broth culture of *Streptococcus equi* in tryptose-dextrose broth containing 5 per cent of sterile defibrinated blood. The tests were incubated for twenty-four hours at 37 C and then examined for growth and hemolysis. The end point was considered to be the last tube in which there was complete absence of growth and no hemolysis. The lowest concentration of penicillin detected by the test was 0.0097 unit per 0.5 cc. of serum.

### RESULTS OF THE IN VITRO SENSITIVITY TESTS OF VARIOUS ORGANISMS

Results of sensitivity tests on organisms recovered from equine infections are shown in tables 2, 3, and 4. Nine strains of streptococci of Lancefield group C (Ogura type A)[2] were completely inhibited by 0.02 unit of penicillin per cubic centimeter of medium. One culture of an Ogura type B streptococcus was completely inhibited by 0.01 unit per cubic centimeter of medium, and *Str. equi* was regularly inhibited by the same concentration. *C. equi* had a high resistance to the action of penicillin, 8 to 10 units per cubic centimeter being required for complete inhibition of growth with twenty-four hours incubation. Some strains were only partially inhibited by 10 units per cubic centimeter of medium. *S. equirulis* was quite resistant to penicillin, 2 to 4 units per cubic centimeter being required to effect complete inhibition. One strain grew in pin point colonies at 4 units per cubic centimeter.

### DOSAGE AND BLOOD LEVEL

All determinations of the blood level of penicillin were made on normal horses following intramuscular injection. The penicillin solutions were prepared immediately before use by dissolving 100,000 units in 20 cc. of sterile saline, giving a concentration of 5,000 units per cubic centimeter. The greatest quantity injected at one point was 20 cc. When additional vials or a fractional quantity of a 20-cc. vial was required to make the total dose, it was injected at a separate point. Doses were accurately measured in units per pound of body weight.

Determinations of the amount of penicillin in the blood serum were made following doses of 100, 200, 300, 500, 1,000, 2,000 and 3,000 units per pound. The sodium salt of penicillin was used. No evidence of irritation was noted either by swelling or soreness at the site of injection. Blood samples were taken aseptically from the jugular vein at intervals of twenty minutes for the first hour, and thirty minute intervals thereafter.

With a dose of 100 units, penicillin was still present in the blood serum in detectable quantity one hour following injection in each of six trials, and at one and a half hours in one trial.

In five trials, with a dose of 200 units, a detectable amount was present for one and a half hours in 2 cases, for two hours

TABLE 2—In vitro Sensitivity to the Action of Penicillin of Test Strains of Staphylococci and of Strains of Streptococci Isolated from Equine Infections

| Organism | Oxford units of penicillin per cc. of medium | | | | | |
|---|---|---|---|---|---|---|
| | Control | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 |
| 1. Sta. aureus (H) ..... | +++ | ++ | + | — | — | — |
| 2. Sta. aureus (SM) ..... | +++ | ++ | + | — | — | — |
| 3. Sta. aureus (H) ..... | +++ | ++ | ± | ± | — | — |
| 4. Str. C-203... | +++ | — | — | — | — | — |
| 5. Str. equi..... | +++ | — | — | — | — | — |
| 6. Str. Group c* | +++ | ++ | — | — | — | — |
| 7. Str. Group c. | +++ | ++ | — | — | — | — |
| 8. Str. Group c. | +++ | ++ | — | — | — | — |
| 9. Str. Group c. | +++ | ++ | — | — | — | — |
| 10. Str. Group c. | +++ | ++ | — | — | — | — |
| 11. Str. Group c. | +++ | ++ | — | — | — | — |
| 12. Str. Group c. | +++ | + | — | — | — | — |
| 13. Str. Group c. | +++ | ++ | — | — | — | — |
| 14. Str. Group c. | +++ | ++ | — | — | — | — |
| 15. Str. Group c. | +++ | — | — | — | — | — |
| 16. Str. non-hemolytic ... | +++ | — | — | — | — | — |

*Cultures 6 to 14 inclusive are Ogura type A, culture 15 Ogura type B, and culture 16, a non-hemolytic streptococcus isolated from a foal dead at term.

+ + + good growth, + + moderate growth, + light growth, ± few pin point colonies,— no growth.

in one case, and for two and a half hours in 2 cases.

When using a dose of 300 units, penicillin was present in the blood serum in detectable quantity at two hours following injection in two trials, in two and a half hours in three trials, and in three hours in one trial.

Doses of 500 units did not materially prolong the period of detectable blood level over that produced by a dose of 300 units. However, the serum level present at the end of the two-hour period tended to be higher for animals of comparable age and weight. Most of the trials using a dose of 500 units were on young foals, and the elimination of the drug appeared to be more rapid in foals below the age of 6 weeks than in older animals. This also seemed to be the case with doses of 1,000 units. In this respect, it was interesting to note that, in 2 instances, doses of 1,000 units produced detectable blood levels for longer periods than a dose of 2,000 units, and in one instance equalled the persistence of a dose of 3,000 units. The doses of 2,000 and 3,000 units were used on younger foals (table 5). However, the number of trials was too few to warrant the conclusion that a larger dose is required to maintain an effective level in the blood of a very young foal.

Doses of 1,000, 2,000, and 3,000 units prolonged the time to three and four hours during which penicillin could be detected in the blood of young foals. The results were not consistent, however, as 1 foal receiving a dose of 2,000 units failed to maintain an effective blood level as long as 2 other foals receiving 1,000 units.

In general, increasing the size of the dose in the steps of 100, 200, 300, 500, 1,000 and 2,000 units had the effect of doubling the concentration of penicillin in the serum during the first hour. The initial blood level at twenty minutes following injection usually was doubled for the respectively larger dose. There were some instances in which the drug was apparently absorbed more slowly, but the blood levels for the forty-minute period were very uniform for the same doses. Considerable variation in blood levels was encountered during the second and third hours after injection of a uniform dose in different animals.

TABLE 3—The in vitro Sensitivity of Corynebacterium equi to Penicillin

| | Units of penicillin per cc. of medium | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Culture | Control | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| C. equi 1 | +++ | +++ | +++ | +++ | ++ | + | ± | ± |
| C. equi 2 | +++ | +++ | +++ | +++ | +++ | ++ | ++ | + |
| C. equi 3 | +++ | +++ | +++ | +++ | ++ | ++ | ± | — |
| C. equi 4 | +++ | +++ | +++ | +++ | ++ | ++ | ++ | + |
| C. equi 5 | +++ | +++ | +++ | +++ | ++ | ± | — | — |
| C. equi 6 | +++ | +++ | +++ | ++ | + | ± | ± | — |
| C. equi 7 | +++ | +++ | +++ | +++ | ++ | + | ± | — |
| C. equi 8 | +++ | +++ | +++ | +++ | ++ | ++ | ++ | + |
| C. equi 10 | +++ | +++ | +++ | +++ | ++ | ± | — | — |
| C. equi 44 | +++ | +++ | +++ | +++ | +++ | ++ | ++ | + |
| C. equi 52 | +++ | +++ | +++ | +++ | ++ | ++ | + | ± |

+++ good growth, ++ moderate growth, + light growth, ± numerous pin point colonies, — no growth.

## Discussion

There appears to be general agreement that, to obtain consistently satisfactory results with penicillin, its concentration in the blood must be maintained at a level equal to, or above, the amount that inhibits growth of the infecting organism. To attain this end, dosage to produce the necessary blood level must be used, and the dose must be repeated at regular intervals so spaced that the blood level does not fall below the inhibitory concentration for the infecting organism. Subinhibitory blood concentration of penicillin may not only fail

to control the infection, but may produce penicillin fastness of the infecting organism so that even greater amounts may be ineffective.

Of extreme importance also is the sensitivity of the infecting organism to the drug. It is evident that best results are obtained against organisms inhibited by very low concentrations, and that infections caused by organisms of high penicillin resistance require more intensive treatment. Treatment for infections caused by the more resistant organisms may prove impractical because of cost. In others, the resistance of the infecting organism will be so great that penicillin therapy is definitely contraindicated.

In general, for foals 3 months or more of age and for horses up to adult age and weight, penicillin dosage of 100 units will produce blood levels which may be detected* one hour after injection but not at one and a half hours. Dosage at the rate of 200 units will result in blood levels which may be detected for an average of about two hours, but varying from one and a half hours to two and a half hours. Dosage of 300 units will result in blood levels which persist quite uniformly for two and a half hours and occasionally for three hours. With doses of 500 units, the detectable blood level should be consistently maintained for two and a half to three hours in large foals and heavier animals. For the young foal, below 6 weeks of age, it appears that a dose of 500 units is not likely to be effective for more than two hours. A detectable level will persist for three to four hours when a dose of 1,000 units is used, and doses in excess of this amount do not materially prolong the period of detectable blood level, but produce a higher concentration of penicillin in the serum for similar periods.

A strain of *Str. equi* was consistently inhibited *in vitro* by 0.01 unit of penicillin per cubic centimeter of medium, both in blood broth and on blood-agar plates. As shown by results obtained on normal horses (table 5) the dosage required to maintain this level in the serum would be 100 units every hour, 200 units every two hours, or 300 units every two and a half hours. This dosage applies to foals over 3 months of age and also to older animals. It is probable that a dose of 300 units every three hours would be effective on clinical trials. A dose of 500 units each three hours would probably assure an effective blood level in horses 1 year of age, as equal doses of body weight appeared to last longer in heavier animals.

TABLE 4—The in vitro sensitivity to Penicillin of Strains of Shigella equirulis (Bacterium viscosum equi)

| | Units of penicillin per cc. of medium | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Organism | Control | 0.25 | 0.50 | 1.0 | 2.0 | 3.0 | 4.0 | 6.0 |
| Shigella equirulis (G).. | +++ | +++ | ++ | + | ± | ± | — | — |
| Shigella equirulis (K).. | +++ | +++ | + | ± | — | — | — | — |
| Shigella equirulis (H).. | +++ | +++ | ++ | + | ± | — | — | — |
| Shigella equirulis (F).. | +++ | +++ | ++ | + | ± | ± | ± | — |
| Shigella equirulis (E).. | +++ | +++ | ++ | ± | ± | — | — | — |

+++ Good growth, ++ moderate growth, + slight growth, ± numerous pin point colonies, — no growth.

The streptococci most frequently found in navel infections and septicemia of foals, genital infections of mares, wound infections of horses, and in equine respiratory diseases other than strangles, belong to that part of Lancefield group C which Ogura[2] designated as type A. Nine strains of streptococci of this type, tested *in vitro* for sensitivity to penicillin, were completely inhibited on blood-agar plates by 0.02 unit per cubic centimeter of medium (table 2). One culture of group C streptococcus, Ogura type B, isolated from the hip joint of a foal, was completely inhibited by 0.01 unit per cubic centimeter. A blood level which would be effective against these organisms dropped to or somewhat below the inhibition point in one hour with a dose of 100 units per pound, in one and a half to two hours with a dose of 200 units, and in two and a half hours with a dose of 300

*The sensitivity of the test being 0.0097 unit per 0.5 cubic centimeter of serum.

units. According to results obtained in six determinations, a dose of 300 units could not be depended upon to produce a blood level of 0.02 units at three hours following injection. A dose of 500 units maintained an effective level approximately three hours in large foals of 3 to 4 months of age, and in older animals. However, in very young foals a dose of 500 units maintained a blood level of 0.02 units per cubic centimeter or more for only two hours. Considering the acute nature of streptococcic infections in foals this dosage seemed desirable.

Staphylococci of equine origin were not

TABLE 5—Blood Levels of Penicillin Resulting from Various Doses

| Age of Animal | Weight in. lb. | Dose in units per lb. | Total Dose, units of penicillin | Units per cc. of serum at specified time intervals following injection: Minutes 0:20 | 0:40 | 1:00 | Hours and Minutes 1:30 | 2:00 | 2:30 | 3:00 | 3:30 | 4:00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 yr. | 840 | 100 | 84,000 | 0.077 | 0.038 | 0.019 | .0 | .0 | | | | |
| 3 yr. | 840 | 100 | 84,000 | 0.155 | 0.077 | 0.019 | .0 | .0 | | | | |
| 5 yr. | 1180 | 100 | 118,000 | 0.155 | 0.077 | 0.038 | 0.019 | .0 | | | | |
| 1 yr. | 490 | 100 | 49,000 | 0.077 | 0.038 | 0.019 | .0 | .0 | | | | |
| 1 yr. | 620 | 100 | 62,000 | 0.077 | 0.038 | 0.019 | .0 | .0 | | | | |
| 4½ mo. | 350 | 100 | 35,000 | 0.155 | 0.077 | 0.038 | .0 | .0 | | | | |
| 3 mo. | 250 | 100 | 25,000 | 0.155 | 0.077 | 0.019 | .0 | .0 | | | | |
| 1 yr. | 620 | 200 | 124,000 | 0.155 | 0.155 | 0.077 | 0.077 | 0.038 | 0.019 | .0 | | |
| 1 yr. | 490 | 200 | 98,000 | 0.155 | 0.077 | 0.038 | 0.019 | .0 | .0 | .0 | | |
| 5 yr. | 1180 | 200 | 236,000 | 0.31 | 0.31 | 0.155 | 0.155 | 0.077 | 0.019 | .0 | | |
| 4½ mo. | 350 | 200 | 70,000 | 0.31 | 0.31 | 0.155 | 0.077 | 0.038 | .0 | .0 | | |
| 3 mo. | 250 | 200 | 50,000 | 0.31 | 0.15 | 0.077 | 0.019 | .0 | .0 | .0 | | |
| 5 yr. | 1180 | 300 | 354,000 | 0.62 | 0.31 | 0.155 | 0.077 | 0.038 | .0 | .0 | | |
| 3 yr. | 840 | 300 | 252,000 | 0.31 | 0.31 | 0.155 | 0.077 | 0.038 | 0.019 | .0 | | |
| 3 yr. | 840 | 300 | 252,000 | 0.31 | 0.31 | 0.155 | 0.077 | 0.077 | 0.038 | .0 | | |
| 4½ mo. | 310* | 300 | 93,000 | 0.62 | 0.31 | 0.155 | 0.077 | 0.038 | 0.019 | .0 | | |
| 4½ mo. | 310* | 300 | 93,000 | 0.31 | 0.31 | 0.31 | 0.155 | 0.077 | 0.038 | 0.019 | | |
| 4½ mo. | 350 | 300 | 105,000 | 0.62 | 0.31 | 0.155 | 0.077 | 0.019 | .0 | .0 | | |
| 5 yr. | 1180 | 478 | 565,000 | 0.62 | 0.62 | 0.31 | 0.155 | 0.155 | 0.077 | 0.038 | 0.019 | .0 |
| 3 wk. | 150 | 500 | 75,000 | 1.24 | 0.62 | 0.31 | — | 0.0194 | .0 | | | |
| 1 mo. | 170 | 500 | 85,000 | 0.62 | 0.62 | 0.31 | 0.077 | 0.038 | .0 | | | |
| 1½ mo. | 220 | 500 | 110,000 | 1.24 | 1.24 | 0.62 | 0.31 | 0.077 | | | | |
| 2½ mo. | 280 | 500 | 140,000 | 0.62 | 0.62 | 0.31 | 0.077 | 0.077 | 0.19 | | | |
| 3½ mo. | 330 | 500 | 165,000 | 1.24 | 0.62 | 0.31 | 0.155 | 0.077 | 0.038 | | | |
| 3½ mo. | 330 | 500 | 165,000 | 1.24 | 0.62 | 0.31 | 0.31 | 0.155 | 0.077 | 0.038 | | |
| 3 wk. | 150 | 1000 | 150,000 | 2.48 | 1.24 | 0.62 | 0.155 | 0.038 | 0.019 | | | |
| 1 mo. | 170 | 1000 | 170,000 | 2.48 | 1.24 | 0.62 | 0.155 | 0.07 | .0 | .0 | | |
| 1½ mo. | 220 | 1000 | 220,000 | 2.48 | 1.24 | 1.24 | 0.31 | 0.155 | 0.077 | .0 | | |
| 2½ mo. | 280 | 1000 | 280,000 | 2.48 | 1.24 | 0.62 | 0.31 | 0.31 | 0.31 | 0.077 | 0.038 | |
| 3½ mo. | 330 | 1000 | 330,000 | 1.24 | 1.24 | 1.24 | 0.62 | 0.31 | 0.155 | 0.077 | 0.038 | 0.019 |
| 1 mo. | 185 | 2000 | 370,000 | 4.96 | 2.48 | 1.24 | 0.62 | 0.31 | 0.077 | 0.038 | .0 | .0 |
| 1 mo. | 185 | 3000 | 555,000 | 4.96 | 2.48 | 2.48 | 1.24 | 0.62 | 0.15 | 0.077 | 0.038 | 0.019 |

*Foal did not take any feed or water during the day.

available for study. However, if the sensitivity of the test strains of staphylococci giving repeated sensitivity readings of 0.03 to 0.04 unit per cubic centimeter of medium was representative of the group, this type of infection would require more intense treatment to maintain an inhibitory blood level than that necessary for streptococci.

Eleven strains of *C. equi* were tested for *in vitro* sensitivity to penicillin. From 8 to 10 units per cubic centimeter were required for complete inhibition of growth with some strains. Others were only partially inhibited by 10 units per cubic centimeter of medium (table 3). Since such concentrations exceeded any blood level obtainable by practical dosage, penicillin in all probability would be ineffective in the treatment of infections caused by this organism.

For *S. equirulis*, a dose of 300 or less units did not result in a sufficient blood level to inhibit the organism. A dose of 500 units produced a blood level sufficient to cause only partial inhibition of the organism, and such blood level remained for an average of only forty minutes. With dosage of 1,000 units, concentrations near the inhibitory level were present in the blood at twenty minutes after injection, but fell to a subinhibitory level in one hour, and to an ineffective level in one and a half hours. Doses of 2,000 and 3,000 units produce blood concentrations which, during the first hour after injection, are satisfactory for good inhibitive effect against the organism. From these results, it appears that treatment against infections caused by *S. equirulis* require frequent treatment with large doses.

SUMMARY

Data were obtained on the *in vitro* sensitivity to penicillin of a number of strains of organisms causing infections in horses. Blood-level responses from intramuscular administration of penicillin in saline solution were correlated with organism sensitivity in regard to therapeutic use of the drug.

For *Streptococcus equi* infections (strangles) in horses, it appeared that the minimum dosage should be 300 units per pound of body weight every three hours. For infections caused by other streptococci, this dosage appeared adequate for only two and a half hours, while 500 units per pound probably sufficed for three hours except in very young foals, in which 500 units per pound maintained a satisfactory blood level for only two hours.

Judging from the *in vitro* sensitivity, staphylococcal infections would require more intensive treatment than streptococcal.

The resistance of *Shigella equirulis* to penicillin was high—2 to 4 units per cubic centimeter, and hourly dosage of 1,000 to 2,000 units per pound would not maintain completely inhibitive blood levels.

The penicillin resistance of *Corynebacterium equi* is so great (8 to 10 or more units per cc.) that dosage for maintaining effective blood levels appeared impractical.

**References**

[1]Rammelkamp, C. H.: A Method for Determining the Concentration of Penicillin in Body Fluids and Exudates. Proc. Soc. Exptl. Biol. and Med. *51*, (1942): 95.

[2]Ogura, K.: The Strangles Streptococcus, with Particular Reference to Specificity. Jap. Soc. Vet. Sci. *8*, (1929): 174.

## Veterinarian Urgently Needed

The Panama Canal, an agency of the United States Government, is in urgent need of a qualified person to fill the position of veterinarian and meat inspector in the Panama Canal service, at an entrance salary of $3,725 per annum.

This information, together with specifications for the position and applications for federal employment, have been sent to the office of the AVMA by B. F. Burdick, Chief of Office, The Panama Canal, to whom applications should be addressed.

## AAHA Meeting

The American Animal Hospital Association will meet at Hotel Pennsylvania, New York, on April 16-18, in its first regular meeting since the beginning of the war.

A tentative program includes the following speakers: Drs. Joseph DeVita, New Haven, Conn.; C. F. Schlotthauer, Mayo Foundation, Rochester, Minn.; Harold Johnson, Rockefeller Institute, New York; James Farquharson, Fort Collins, Colo.; Wayne Riser, Des Moines, Ia.; John Gadd, Towson, Md.; Fred Mettler, New York; C. N. Bramer, Evanston, Ill; and Capt. Frank Kreuz, MC, USN.

s/R. E. RUGGLES, *Secretary.*

# Orchitis in Swine Due to Brucella Suis

H. C. H. KERNKAMP, D.V.M., M. H. ROEPKE, Ph.D., DONALD E. JASPER, D.V.M.
*St. Paul, Minnesota*

INFLAMMATORY disturbance of the testes is considered to be an important clinical expression of brucellosis in boars. While this is rapidly becoming the accepted fact, sufficient information is not yet available upon which to assess the incidence of orchitis that is due to Brucella infection.

The cases herein reported are the result of observations and studies on what might be described as a fulminating enzoötic of brucellosis in a herd of swine. It deals with the incidence of the disease among the males in the herd especially, and with the clinical, pathologic, and bacteriologic findings thereof.

In order to emphasize the importance of the discovery of this outbreak, particularly from the standpoint of the dissemination of the disease, a brief discussion of certain pertinent factors pertaining to the purpose of the herd seems desirable. It was the business of the owner of these swine to raise and develop a group of young purebred boars and gilts that he might sell and distribute among the farmers in his community. This was somewhat of a specialized undertaking which he had developed to considerable extent. Fifteen to 25 of the more promising young boars and a like number of gilts would be selected from his pig crop each spring and these were prepared to be sold in November and December.

On or about Nov. 5, 1944, while inspecting the young boars (approximately 7 months of age) that were being prepared for sale, the owner observed that the testes of 2 appeared to be abnormally large. This prompted him to seek the opinion and advice of his veterinarian who, after careful study, suspected that these might be cases of orchitis due to infection by Brucella types, and suggested that they be tested for brucellosis. Samples of blood were obtained from both boars and an agglutination test (plate method), using *Brucella abortus* antigen (plate), was conducted. "Well marked" agglutination resulted in both instances. Subsequent to this finding, the situation was brought to our attention with the request that a further and more extensive investigation on the herd be undertaken.

One of us (R) visited the farm on November 10. The herd at this time consisted of 2 yearling boars, 18 spring farrowed boars, 1 aged sow with a litter of 5 suckling pigs, and 26 spring farrowed gilts. Blood samples were taken from the 2 yearling boars, from 5 of the young boars including the 2 that had been "blood-tested" by the attending veterinarian, from the aged sow, and from 7 of the gilts. The results of the agglutination test (tube method) with the samples of blood collected from these animals are shown in table 1, which indicates quite clearly that brucellosis was present in this herd.

A second visit to the farm was made on November 21, since it was agreed at the time of the previous visit that, should the results of the agglutination test show that brucellosis was prevalent in the herd, we were to have the privilege of castrating all the males and examining the remainder of the gilts. It was somewhat of a disappointment to find that 1 yearling boar (Commander) and all of the gilts had been disposed of. We did, however, have the opportunity of collecting blood from each of the remaining boars and to castrate the 18 young boars and obtain the testes. This we proceeded to do immediately.

A blood sample was obtained and a clinical examination of each boar was made before subjecting it to castration. Portions of each testis were taken for histologic study. These were taken immediately after the testes were removed and were fixed in Bouin's fluid. The remainder of each testis was wrapped in waxed paper and taken to the laboratory for bacteriologic examination. For this part of the study, the testes of each animal were minced and pulped together and approximately 0.25 cc. of the expressed fluid from this mass was injected

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The authors are on the staff of the Division of Veterinary Medicine, Minnesota Agricultural Experiment Station, University Farm, St. Paul.

into each of 2 guinea pigs. Four weeks after inoculation, the guinea pigs were sacrificed and cultures made from the spleen. The results of the clinical, serologic, pathologic and bacteriologic examinations are shown in table 2.

*Brucella suis* was isolated by indirect procedures (guinea pig inoculation and subsequent culture of their spleens) from 14 (78.0%) of the males examined. The failure to obtain Brucella organisms from the remaining 4 boars is no assurance that the infection was not present. Although the bacteriologic examination was negative in cases 3 and 12, the tube agglutination test with *Br. abortus* antigen on the blood of these same animals showed agglutination in the 1:500 dilution. Case 14 was also negative bacteriologically but showed a complete agglutination at 1:100 dilution by the tube test. This, it would seem, was a strong indication of Brucella infection in these animals. In case 8, negative in so far as the bacteriology is concerned, the agglutination titer was 1:25. From the standpoint of the histopathology, there was definite evidence of inflammatory changes which, in all probability, were the result of Brucella infection.

Of the clinically recognizable cases of orchitis, boar 6 was considered to be the most acute. Both testes were swollen, somewhat painful to gentle palpation, and the scrotum was warm to the touch. The examination of the glands after removal showed them to be edematous which was later confirmed by microscopic examination. *Br. suis* was isolated from these testes, but the blood agglutination test resulted in complete agglutination in the 1:10 dilution only. On

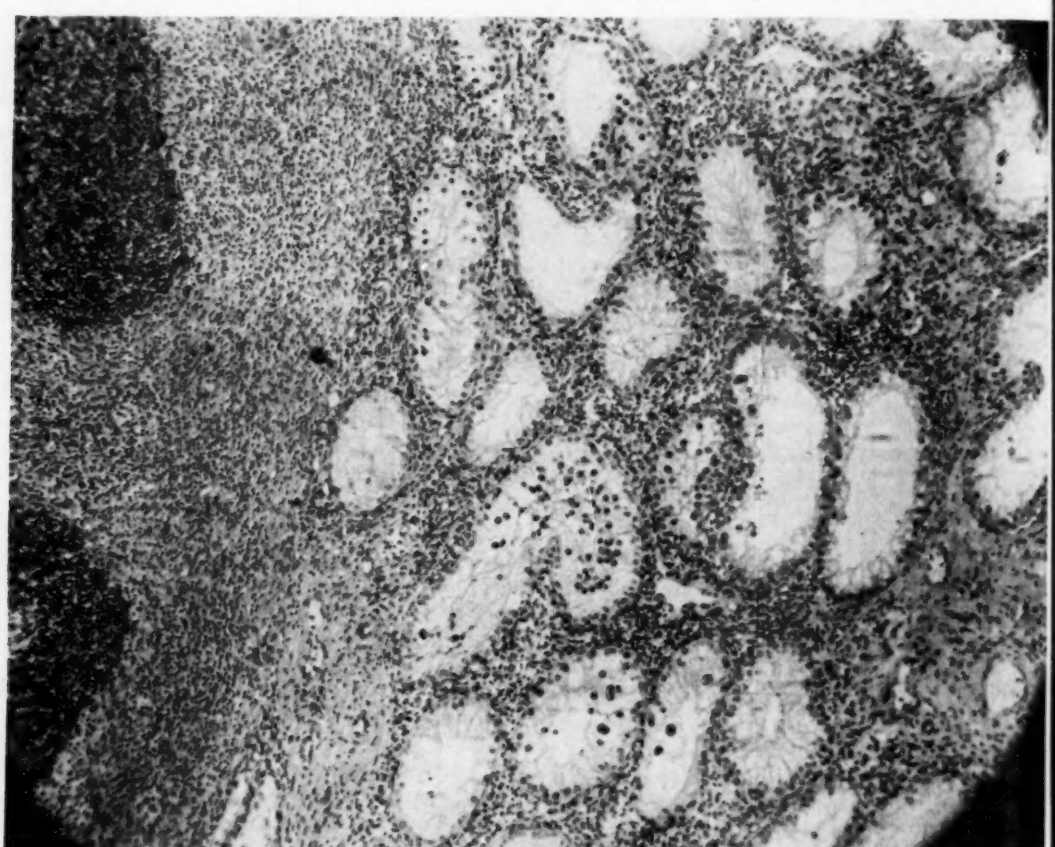

Fig. 1—Shows different degrees of involvement of the seminiferous tubules. Some of the tubules are quite normal whereas in others the cells nearest the lumen have been sloughed, leaving only a few layers of primordial germ cells. Little to no change has occurred in the interstitial tissues. Hematoxylin-eosin, x 120

the basis of the agglutination titer alone, this individual would hardly be considered an infected animal. Likewise, the agglutination reaction of boars 4 and 9 were unusually low and incomplete at the 1:25 dilution. The bacteriologic results in both cases were positive for Brucella. In either case, there was no clinical evidence of orchitis. The histologic examination of the right testis of boar 4 showed focal areas of degeneration and necrosis of the seminiferous tubules. No tissue reactions were found in the case of boar 9 however. No special mention seems necessary for the other animals in the series. The clinical, pathologic, bacteriologic, and serologic status is covered in table 2. On the basis of the agglutination test, bacteriologic examination, and microscopic pathology, it would appear that at least 17 of the 18 young boars (94.4%) were infected.

TABLE I—Agglutination Reactions of a Group of Swine to the Tube Test for Brucellosis

| Identification | Sex | Age in Mo. | Agglutination reactions at the indicated dilutions | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 : 10 | 1 : 25 | 1 : 50 | 1 : 100 | 1 : 250 | 1 : 500 | 1 : 1000 |
| Commander | Male | 14 | + | — | — | — | — | — | — |
| O. K. Joe | Male | 14 | + | I | — | — | — | — | — |
| Arlington | Male | 7 | + | + | — | — | — | — | — |
| 1 MR | Male | 7 | + | + | + | + | + | + | I |
| 1 M6 | Male | 7 | + | + | + | + | + | + | — |
| 2 U6 | Male | 7 | I | — | — | — | — | — | — |
| 176 | Male | 7 | + | — | — | — | — | — | — |
| 1 LR-1 | Female | 7 | + | + | + | + | + | + | — |
| 1 LR-2 | Female | 7 | + | + | + | + | I | — | — |
| 1 LR-3 | Female | 7 | + | + | + | + | + | + | + |
| 2 LR-1 | Female | 7 | + | + | + | + | + | + | + |
| 2 LR-2 | Female | 7 | + | + | + | + | + | + | I |
| 1 LL | Female | 7 | + | + | + | + | + | + | — |
| 2 LL | Female | 7 | + | + | + | + | + | + | — |
| FS | Female | 12 | + | + | + | I | — | — | — |

+ = complete agglutination. I = incomplete agglutination. — = no agglutination.

## Clinical Observations

Aside from the occurrence of an orchitis in some of the boars in this herd, there were no other physical symptoms of clinical significance. In those animals manifesting an inflammatory reaction of the testes, the involvement was bilateral in some cases and unilateral in others. Those with unilateral involvement were more easily recognized by visual inspection since the unequal size of the testes was quite noticeable in some cases. In this connection, we wish to point out that the larger of the two testes by clinical comparison is not necessarily the one that is diseased. In fact, the larger of the testes may be normal and the diseased testes smaller because, in case of the latter, the gonad had undergone atrophic changes. The contrast is greatest in those cases in which the atrophic process is the most advanced. The cases in which atrophy had occurred were the more chronic. In the acute cases, the gonads were usually swollen and this was detected by palpation. Palpation of the gonads may disclose soft, fluctuating areas characteristic of abscesses. This was observed in one case.

## Pathologic Findings

In a very large proportion of the testes examined after removal, there was no gross evidence of injury or disease. This was the case in 27 of the 36 testes examined. Three of the testes were swollen so that the tunica albuginea was very tense. Incision of this resulted in a marked bulging of the glandular substance. Six of the testes examined were small, measuring approximately 10 cm. (3 inches) in length. One of these was quite soft and somewhat

**TABLE 2—Summary of Serologic, Bacteriologic and Pathologic Findings in a Series of Male Swine, Naturally Infected with Brucellosis**

| Anim. No. | Agglutination reactions at the indicated dilutions | | | | | | | | | Pathology | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 : 10 | 1 : 25 | 1 : 50 | 1 : 100 | 1 : 250 | 1 : 500 | 1 : 1000 | 1 : 2000 | Bacteriologic | Gross (R = right testis, L = left testis) | Microscopic |
| 1 | + | + | + | + | + | + | — | — | + | R swelling<br>L no visible lesions | degen., necr. w<br>degen., edema f |
| 2 | + | + | I | — | — | — | — | — | + | R no visible lesions<br>L no visible lesions | degen., edema f |
| 3 | + | + | + | + | + | + | — | — | — | R no visible lesions<br>L no visible lesions | degen., necr. f<br>no tissue reaction |
| 4 | + | I | — | — | — | — | — | — | + | R no visible lesions<br>L no visible lesions | degen., necr. f<br>no tissue reaction |
| 5 | + | + | + | + | + | — | — | — | + | R no visible lesions<br>L no visible lesions | degen., necr., edema f<br>no tissue reaction |
| 6 | + | — | — | — | — | — | — | — | + | R swelling<br>L swelling | degen., necr., edema w<br>degen., necr., edema w |
| 7 | + | + | + | + | + | + | — | — | + | R no visible lesions<br>L atrophy | no tissue reaction<br>degen., necr., edema f |
| 8 | + | + | — | — | — | — | — | — | — | R no visible lesions<br>L no visible lesions | edema w •<br>edema w • |
| 9 | I | I | — | — | — | — | — | — | + | R no visible lesions<br>L no visible lesions | no tissue reaction<br>no tissue reaction |
| 10 | + | + | + | + | I | — | — | — | + | R no visible lesions<br>L no visible lesions | no tissue reaction<br>no tissue reaction |
| 11 | + | + | + | + | + | + | — | — | + | R atrophy, soft<br>L no visible lesions | degen., necr. f<br>no tissue reaction |
| 12 | + | + | + | + | + | I | — | — | — | R no visible lesions<br>L no visible lesions | degen., edema f<br>degen., necr. f |
| 13 | + | + | + | + | + | I | — | — | + | R no visible lesions<br>L no visible lesions | degen., necr. f<br>degen., necr. f |
| 14 | + | + | + | + | — | — | — | — | — | R atrophy<br>L no visible lesions | degen., necr. f<br>degen., necr. f |
| 15 | + | + | + | + | + | + | + | I | + | R atrophy, abscess<br>L no visible lesions | degen., necr., absc., w •<br>degen., necr. f |
| 16 | + | + | + | + | + | + | + | — | + | R no visible lesions<br>L atrophy, abscess | degen., necr. f<br>degen., necr., absc., w • |
| 17 | + | + | + | I | — | — | — | — | + | R atrophy, necr.<br>L no visible lesions | degen., necr. w<br>degen., necr. f |
| 18 | + | + | + | + | + | — | — | — | + | R no visible lesions<br>L no visible lesions | degen., necr. f<br>no tissue reaction |
| 19 | + | + | I | — | — | — | — | — | Not Castrated | | |

Serologic: + = complete agglutination; I = incomplete agglutination; — = no agglutination.
Bacteriologic: + = *Brucella suis* isolated from composite sampling of both testes; — = failure to isolate *Br. suis*.
Pathologic: absc. = abscess; degen. = degenerative changes; necr. = necrosis; f = focal; w = widespread; • = leucocytic infiltration.

pulpy, and in two there was definite evidence of abscessation and liquefaction necrosis and areas that had not yet undergone liquefaction.

From the standpoint of the histopathologic findings, the cellular elements adjacent to the lumen of the seminiferous tubules appeared to be attacked first (fig. 1). They had undergone degeneration and had sloughed into the lumen. This process extended deeper until in the more advanced stage the entire germinal epithelium had sloughed away leaving only a slightly thickened basement membrane (fig. 2). The Sertoli cells were more resistant and appeared to be the last of the tubule cells to degenerate. The presence of syncytial Sertoli cells in the lumen of some of the tubules was observed in a number of instances. Small abscesses were observed in some of the testes studied (fig. 3). In these cases, there was always a greater or lesser amount of proliferative reaction in the interstitial tissues adjacent to the abscess and also much evidence of an inflammatory exudate.

## PREVIOUS HISTORY ON THE HERD

Nothing of definite significance with respect to the source of the brucellosis in this herd was learned by questioning the owner. Except for the introduction of 2 bred gilts

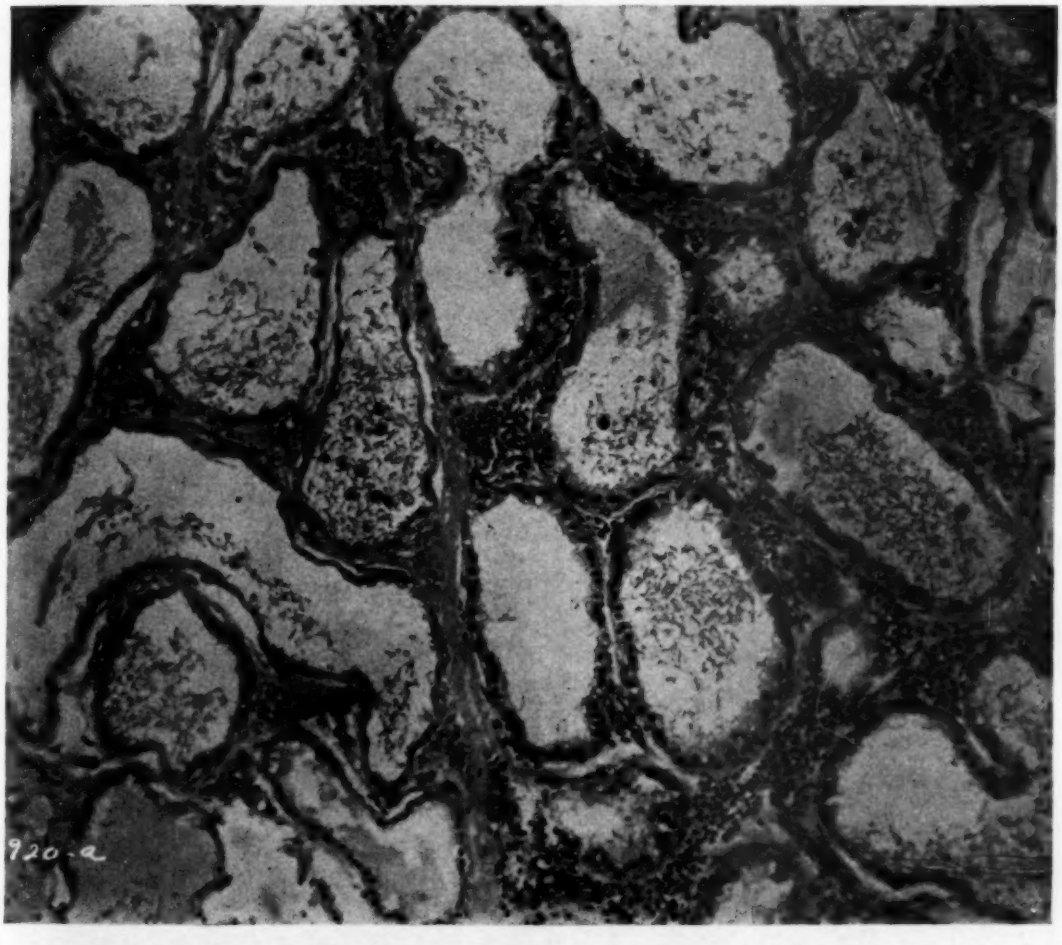


Fig. 2—The seminiferous tubules are practically devoid of any germinal epithelium. Many of the tubules contain spermatozoa which are undergoing degeneration. A collection of desquamated Sertoli or sustentacular cells can be seen in some of the tubules. These probably originated in a portion of the tubule not yet attacked by the degenerative process and then passed into the diseased area. Hematoxylin-eosin, x 120

Serologic: + = complete agglutination; I = incomplete agglutination; — = no agglutination.
Bacteriologic: + = *Brucella suis* isolated from composite sampling of both testes; — = failure to isolate *Br. suis*.
Pathologic: absc. = abscess; degen. = degenerative changes; necr. = necrosis; f = focal; w = widespread; • = leucocytic infiltration.

in December, 1943, no swine from outside sources had been brought into the herd for two years previously. He reported, however, that in March, 1944, 1 of these gilts farrowed 1 dead and 1 living pig. The other farrowed a litter of living pigs but they all died before reaching 3 days of age. A similar experience occurred with 1 of his native gilts. All 3 of these gilts were said to have farrowed their pigs at term. None of his gilts and sows aborted. It was learned that several of the females failed to conceive on the first service during the mating season in the spring of 1944.

Of considerable secondary interest to the occurrence of this outbreak is the fact that an 11 year old boy in this family was ill. In February, 1944, the boy became ill and was confined for the greater part of five weeks. He recovered sufficiently to be able to return to school for the remainder of the school year but at no time did he display the normal vigor and vitality of a boy of his age. No definite diagnosis had been made of his case. In September, 1944, he had a remission of his illness, although less severe, it was at this time that his case was diagnosed as undulant fever. In order to determine the probable source of infection, the attending physician requested that a test of the cattle on the farm be made to ascertain their status to brucellosis. This was performed by the local veterinarian but no reactors were disclosed. The relationship of the boy's illness to brucellosis in the swine was not suspected until after the 2 cases of orchitis in the boars referred to earlier in this report were discovered. It is reported that the boy was particularly fond of the swine and whenever it was possible, he would spend time jostling and playing with the pigs. This had been his trait for the past several

Fig. 3—Two small abscesses surrounded by thick dense zone of inflammatory exudate and considerable interstitial involvement and degeneration of the germinal epithelium. Hematoxylin-eosin, x 120.

years. It has not been proved that his illness was due to *Br. suis;* however, the circumstantial evidence points strongly in that direction.

The writers are indebted to Doctor A. L. Birch of Worthington, Minnesota, for bringing this herd to their notice and helping to arrange for the study herein reported.

## Penicillin in the U. S. A.

Prof. Jean Verge (Alfort), following a tour among American producers of veterinary supplies, writes:[1] The production of penicillin exceeds 100 billion Oxford units per month. The output is no longer reserved exclusively for the military service; some is employed to combat the infectious diseases of animals which lie within the same scope of infections as in human medicine. The yellow, amorphous powder of penicillin sodium is put up in 20-cc. vials containing 100,000 O.U. The price, as of April 1945, was $2.00 per vial. The solution is made directly in the vial so that the concentration contains 5,000 O.U. per cubic centimeter. The expiration date for the powder, under refrigeration, is from twelve to eighteen months but only twenty-four to seventy-two hours after the solution is made up for use.

For large animals, according to the gravity and extent of the morbidity, the dosage recommended is 20,000 to 40,000 O.U. per 100 kg. of live weight, repeated every three or four hours during the critical stage of the disease. The daily requirement, therefore, is 1 to 3 million units per day costing $20.00 to $60.00 (800 to 2,400 francs).

For small animals, the dosage varies from 100 to 200 units per kilogram of body weight, meaning that a dog of 10 kg. (22 lb.) would receive 1,000 to 2,000 units daily, or from 6,000 to 8,000 units, according to weight and malady.

For topical use, 500 units per cubic centimeter is recommended, and the course of treatment varies with the nature of the disease, *e.g.,* suppurative arthritis, mastitis, etc. For chronic mastitis, from 20,000 to 25,000 O.U. are injected through the teat canal every six to eight hours, with careful massage to assure distribution throughout the gland.

The author discusses good response obtained from penicillin in America in the treatment of bovine mastitis, human anthrax, equine strangles, staphylococcic dermatitis, pneumonia and leptospirosis of dogs, and, by contrast, its inefficacy in encephalitis, psittacosis, Newcastle disease and, in general, all virus and gram-negative bacterial infections.

[1]Prof. J. Verge, *Ecole nationale Vétérinaire d'Alfort*: Excerpts from *Pénicillinothérapie et Médecine vétérinaire*, Rev. Path. Comp. et Hyg. Gen., 45, (July-Aug. 1945): 241-245. Professor Verge is an honorary member of the AVMA.

## Voluntary Health Services

The voluntary health service of the United States, based on a survey financed by the Rockefeller Foundation and carried out by the National Health Council, has 20,000 private agencies enlisting the service of 300,000 persons, and to which the American people contribute about 50 million dollars a year. But, says the report (*Survey-Midmonthly*, Oct. 1945), these do not attain the desired end because they are "uneven in their usefulness." Over-all planning for life and health conservation in the absence of centralized direction is lacking.

To meet the emerging community needs, a strong central health organization in each city to coördinate and integrate the local agencies and a unified national appeal for funds in lieu of individual efforts are among the directives set down as essential to the building of the nation's voluntary health service envisaged.

Contributing to these recommendations were: Dr. Reginald M. Atwater, executive secretary of the American Public Health Association; Bleecker Marquette, director of the Public Health Federation; Paul Feiss, chairman of the Cleveland, Ohio, Community Fund; Professor Ira V. Hiscock of Yale University; and Drs. Louis I. Dublin and Philip S. Platt of New York.

The difference between science and technology is that science creates the method and technology uses it and asks no questions.

The chemical avidin, found in the white of eggs, combined with the growth factor biotin, destroys germ life *in vitro*. The action has given a new lead to the treatment of cancer.

# Breast Development in an Aged Male Monkey

W. A. YOUNG, D.V.M.
*Chicago, Illinois*

IT HAS been my good fortune to be called upon to treat many wild animals, although the practice of veterinary medicine seldom offers the opportunity for work with such creatures. Sometimes I have succeeded—sometimes not. The following case seems so unusual that it is reported for what interest or value it may have.

"Cholo"

An acquaintance of mine has had a number of monkeys as personal pets. The last one, named "Cholo," was a male ringtail which he received when the monkey was quite young. At the time of death, Cholo was past 8 years of age.

The monkey was seen on various occasions. He was always well fleshed, had a better than average texture of skin and hair, and presented a picture of excellent health. I often wondered about this, since he ate substantially the same food as that served to the family and, in addition, he had a cocktail quite regularly with the family and friends.

The owner could do almost anything with this monkey. Not so his wife, or a stranger. Cholo objected to being restrained or even handled. As he grew older, this trait seemed to become more noticeable. His liking for his owner increased, as did his dislike for the wife of his owner (whom he bit many times), as well as for various other persons who approached him too closely.

During the last few years of the monkey's life, the owner's wife passed through the menopause. Coincident with this, it was noted that Cholo became more friendly toward her and less friendly toward his owner. Finally it reached the point where the wife could handle the monkey under almost any circumstances, while the owner was bitten quite often.

At this time, it was noticed that Cholo was developing breasts, to which condition no particular heed was given until it had reached considerable proportions. These glands were not the typical monkey breasts with small glands and large elongated nipples, but were large, well-formed organs with tiny button-type nipples. They were so large that they extended beyond the chest and were slightly pendulous (*see* figure).

A specialist in human endocrinology was called in consultation. He pronounced the case unusual, as it is almost unknown in the male human being for such breast development to occur after puberty. The monkey was now of an age comparable to that of a man of 50 to 60 years, but appeared to

Dr. W. A. Young is managing director of The Anti-Cruelty Society, Chicago.

be sexually potent. Both testes appeared normal and were in the scrotum. There was no indication of anything abnormal except the breast development. His temperament continued to become progressively more disagreeable toward the owner, while at the same time more friendly toward the wife.

One day the climax came. The owner approached his wife, who was holding Cholo. The monkey flew into a rage, leaped upon his owner, almost tore one ear from his head, bit him in the neck, and chased him about the apartment, but was finally subdued and confined to his cage. At the owner's request, the monkey was humanely destroyed. At the autopsy, I coöperated with the endocrinologist already mentioned, and with a pathologist who later made microscopic studies of the brain, thyroids, parathyroids, pituitary body, adrenals, testicles, liver, spleen, kidneys, pancreas, and thymus, as well as tissues in the breast region.

No Negri bodies or other abnormalities were found in the brain. All tissues except those in the mammary region appeared to be perfectly normal, macroscopically and microscopically. The tissues in the mammary region proved to be mostly fat. The actual glandular tissue was not particularly enlarged. The mammary fat was of the type commonly found in boys developing mammae at, or before, puberty.

This case ends in a question, in that medical history seldom records such breast development in a mature man and since no pathological reason was found for it, either on gross examination or microscopic study. Possibly it was just "monkey business."

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Quinine is extracted from cinchona bark at lower cost by transporting portable laboratories to remote spots where the cinchona trees grow instead of shipping the bulky bark long distances, often at prohibitive expense.

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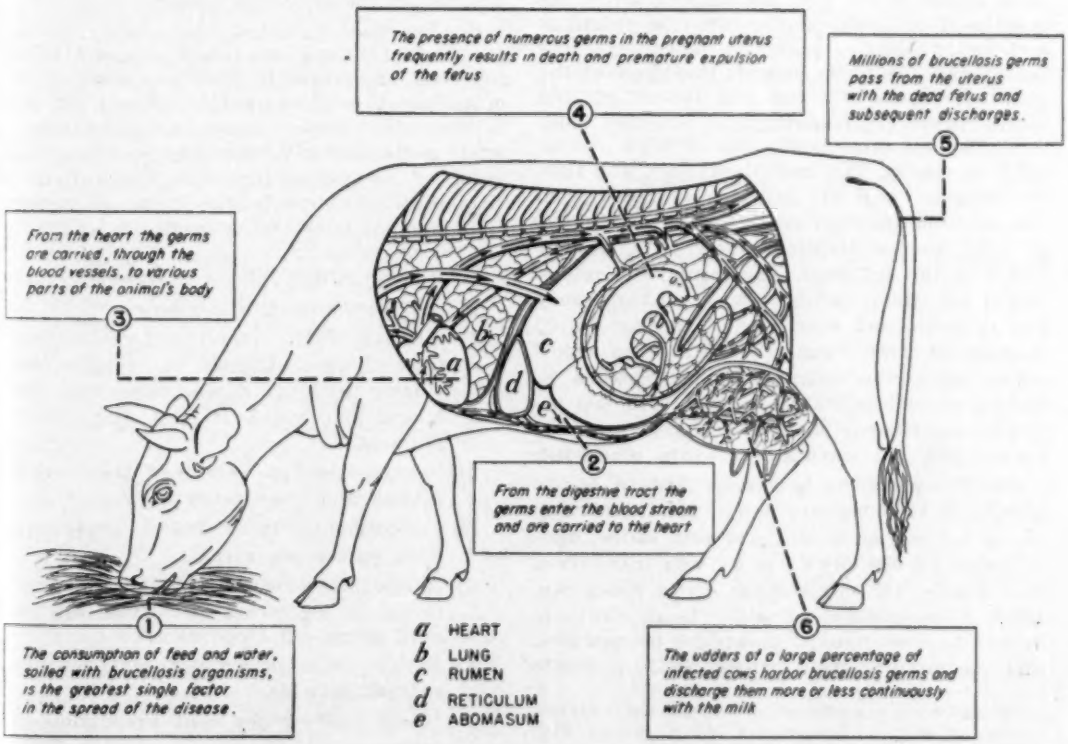
## Route of Brucellosis Germs in Their Attack on Cattle


The presence of numerous germs in the pregnant uterus frequently results in death and premature expulsion of the fetus
4
Millions of brucellosis germs pass from the uterus with the dead fetus and subsequent discharges.
5
From the heart the germs are carried, through the blood vessels, to various parts of the animal's body
3
a
b
c
d
e
2
From the digestive tract the germs enter the blood stream and are carried to the heart
1
The consumption of feed and water, soiled with brucellosis organisms, is the greatest single factor in the spread of the disease.
a HEART
b LUNG
c RUMEN
d RETICULUM
e ABOMASUM
6
The udders of a large percentage of infected cows harbor brucellosis germs and discharge them more or less continuously with the milk

—*Courtesy Bureau of Animal Industry, USDA*

# Trypanosoma Equiperdum Antigen for Complement Fixation
## I. Preliminary Report: Preparation and Titration

LIEUT. VIRGINIA B. HARTRIDGE, SnC., and CAPT. MORRIS D. SCHNEIDER, V.C.
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A NUMBER of antigens have been reported for the complement fixation test for the diagnosis of dourine in horses by Winkler and Wyschlessky[1], Mohler, Eichhorn, and Buck[2], Watson[3], and Reynolds and Schoening[4]. The stability of these antigens was of short duration, except that Watson's preparation "will keep indefinitely if solidified by freezing." However, the latter preparation was antigenically weak, that is, 100 cc. was sufficient for only 500 diagnostic tests. The purpose of this report is to describe the preparation and titration of an improved *Trypanosoma equiperdum* antigen.

### MATERIALS AND METHODS

*I. Preparation of Antigen.*—(*A*) The blood of a rat heavily infected with *T. equiperdum* is collected into 15 cc. of sterile proteose-peptone yeast citrate broth, 1-cc. amounts of which are inoculated intramuscularly into the thigh of each of 12 adult rats. On the morning of the fourth day (88 to 90 hours), the blood of the infected rats is collected into 100 cc. of cold saline-citrate (1%)-merthiolate (1:5,000) solution. The material is filtered through cheesecloth to remove hair and blood clots, and then centrifuged for thirty minutes at 2,500 r.p.m. The supernatant fluid is discarded, and 200 cc. of cold sterile distilled water is gradually added to the sediment. The mixture is refrigerated for twenty minutes, with shaking every five minutes, and then centrifuged for thirty minutes at 2,500 r.p.m. Discarding the supernatant fluid, the sediment is resuspended in 100 cc. of cold saline-merthiolate (1:5,000) solution, centrifuged for thirty minutes at 2,500 r.p.m., and the supernatant again discarded.

*B*) The sediment is resuspended in 50 cc. of cold M/15 phosphate buffer, pH 7.8, merthiolated 1:5,000, or in 50 cc. of cold saline, merthiolated 1:5,000, pH 6.4 to 6.7, and transferred to a sterile, 120-cc. screw-top bottle which contains 1 teaspoonful of glass beads. This is shaken in a mechanical shaker for ten minutes, and the mixture then transferred to a sterile 250-cc. Erlenmeyer flask. The bottle is washed with 25 cc. of the diluting fluid, and the rinse added to the flask. The mixture is rapidly frozen in a bath of dry ice, alcohol, and ether, by continuous rapid twirling in order to avoid breakage of the glass. The contents are then thawed quickly by twirling the flask in a tap water bath. The freezing and thawing operation is repeated five times. After the last thawing, the mixture is centrifuged for fifteen minutes at 3,500 r.p.m. The clear supernatant fluid is carefully removed and labelled fraction 1. To the remaining sediment is added 25 cc. of the diluting fluid (phosphate buffer or merthiolated saline, as used in the original suspension of the material), and the mixture is shaken in a mechanical shaker for five minutes. The freezing and thawing operations (5 in number) are repeated. After centrifuging for fifteen minutes at 3,500 r.p.m., the supernatant fluid is removed and labelled fraction 2. Fractions 1 and 2 contain approximately eighty per cent of the antigenic material.

*C*) Fractions 1 and 2 are pooled and dispensed in 3-cc. amounts into 9-cc. sterile screw-top vials, and stored in the frozen state. A vial of antigen is used as needed, and any left over is discarded. Prior to use, centrifugation is again performed to remove any remaining sediment or flocculated pigment. The antigen is titrated within twenty-four hours of preparation, and at two-week intervals thereafter.

*II. Titration of Antigen.*—(*A*) Reagents:

1) Antigen—prepared as above.
2) Positive serum—obtained from rabbits infected approximately one month previously with *T. equiperdum*, and the serum inactivated at 56 C. for thirty minutes.
3) Negative serum — obtained from normal rabbits and inactivated as above.
4) Complement — fresh, frozen, or lyophilized guinea pig serum.
5) Amboceptor—anti-sheep hemolysin contained in the serum of rabbits injected with sheep red blood cells.
6) Saline — 0.85 to 0.9 per cent aqueous sodium chloride.
7) Sheep cells—2 per cent suspension in saline.

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*B*) Titrations of the Hemolytic System:

1) The standard Kolmer-Wassermann titrations for amboceptor and complement are used.[5]

*C*) Titration of Antigen for Both Antigenic and AC Activity:

1) Two rows of ten tubes each (Wassermann type) are set up in a rack. Four extra tubes are included for controls.
2) The antigen dilutions for the titrations are set up in the front row in the following manner:
3) Transfer 0.5 cc. of each dilution to the corresponding tube of the back row.

Table 1

| Tube | Saline | Antigen | Final Dilution | Remarks |
|---|---|---|---|---|
| 1 | 1.2 cc. | 0.8 cc. | 1:2.5 | |
| 2 | 1.0 | 1.0 of Tube 1 | 1:5 | |
| 3 | 1.0 | 1.0 of Tube 2 | 1:10 | |
| 4 | 2.8 | 0.2 | 1:15 | Mix and discard 1.0 cc. |
| 5 | 1.0 | 1.0 of Tube 3 | 1:20 | |
| 6 | 1.0 | 1.0 of Tube 4 | 1:30 | |
| 7 | 1.0 | 1.0 of Tube 5 | 1:40 | |
| 8 | 0.98 | 0.02 | 1:50 | |
| 9 | 1.0 | 1.0 of Tube 6 | 1:60 | Mix and discard 1.0 cc. |
| 10 | 1.0 | 1.0 of Tube 7 | 1:80 | Mix and discard 1.0 cc. |

This dilution method leaves a final volume of 1.0 cc. in each tube of the front row. If the antigen is very strong, higher dilutions may be used for the titration.

4) After the dilutions are made up, add 0.2-cc. amounts of inactivated positive serum to each tube of the front row; to each tube of the back row add 0.2-cc. amounts of inactivated negative serum.
5) The controls are set up in the following manner:
   a) Positive—0.5 cc. saline, 0.2 cc. inactivated positive serum.
   b) Negative—0.5 cc. saline, 0.2 cc. inactivated negative serum.
   c) Hemolytic system—1.0 cc. saline.
   d) Sheep cells—2.5 cc. saline.
6) Add 1.0 cc. of complement at its predetermined titre to all the tubes except the cell control.
7) After the titrations and controls are set up as outlined above, they are well mixed, and incubated at 6 to 8 C. for sixteen to eighteen hours, followed by ten minutes in a water bath at 37 C.
8) To all tubes except the cell control add 0.5 cc. of amboceptor at its predetermined titre.
9) To all tubes add 0.5 cc. of 2 per cent sheep cells and shake well.
10) All tubes are then incubated in a 37 C. water bath for sixty minutes, centrifuged at 3,000 r.p.m. for fifteen minutes and read in the usual manner.
11) The results are charted, as shown in table 2, and the titre of the antigen calculated:

The AC activity of the antigen should not exceed one-half of the amount to be used in the test. Therefore, in the above example, the antigen should not be AC above a dilution of 1 : 15, as the amount to be used is 1 : 30.

Neither of the serum controls should show any inhibition of hemolysis. If it is present, the titrations are repeated with fresh serum. The hemolytic control should show complete hemolysis.

*III. Procedure for the Test.*—(*A*) Reagents:

1) As outlined under the antigen titration (II, A, 1-7).

*B*) Procedure:

1) Two tubes, front and back, are set up for each serum, and 0.2 cc. of inactivated serum added to each.
2) 0.5 cc. of saline is added to the back tube. This will act as the AC control for the serum.
3) 0.5 cc. of antigen, diluted to titer is added to the front tube.

Table 2

| Tube | Dilution | Front Row | Back Row | REMARKS |
|---|---|---|---|---|
| 1 | 1:2.5 | ++++ | ± | The front row, containing positive serum, shows the antigenic activity. The back row, with the negative serum, shows the AC activity. |
| 2 | 5 | ++++ | — | |
| 3 | 10 | ++++ | — | |
| 4 | 15 | ++++ | — | |
| 5 | 20 | ++++ | — | |
| 6 | 30 | ++++ | — | The highest dilution giving a ++++ reaction is read as one unit. Two units are used in the test. In the example, 1 unit is 0.5 cc. of 1:60; thus, 2 units are in 0.5 cc. of 1:30. |
| 7 | 40 | ++++ | — | |
| 8 | 50 | ++++ | — | |
| 9 | 60 | ++++ | — | |
| 10 | 80 | ++ | — | |

4) Controls are set up as follows:
   a) Positive—two tubes as in routine test, with known positive serum.
   b) Negative—two tubes as in the routine test, with known negative serum.
   c) Antigen—0.5 cc. saline, 0.5 cc. antigen diluted to titre.
   d) Hemolytic system—1.0 cc. saline.
   e) Sheep cells—2.5 cc. saline.
5) The remainder of the test procedure follows paragraphs II, C, 6-10 (under antigen titration) exactly.
6) The interpretation of results is as follows: ++++, +++—positive. ++, +, ±—doubtful. Complete hemolysis—negative.

## RESULTS

The antigenic material of *T. equiperdum*, when prepared as described above, is soluble in solutions of M/15 phosphate buffer (pH 7.8), merthiolated 1:5,000, or in saline, merthiolated 1:5,000 (pH 6.4 to 6.7). Immediately after preparation, the saline extracts are slightly more potent but show a greater decrease in titer, on storage, than the phosphate buffer extracts.

Although the lots have varied slightly in antigenic content, the average lot has yielded about 100 cc. of material sufficient for approximately 4,000 to 5,000 tests.

Antigen prepared by this method has the following advantages:

1) Antigenic yield is decidedly increased.

2) Anticomplementary action is negligible and does not increase with prolonged storage.

3) Has no hemolytic action.

4) The antigen has a sparkling light cherry-red color, and in test dilutions is colorless.

5) While there is a slight drop in titer, the antigen retains its potency for well over two months.

## SUMMARY

A method is described for the preparation and titration of an improved *Trypanosoma equiperdum* antigen for complement fixation. This study is still in progress.

## ACKNOWLEDGMENT

The strain of *T. equiperdum* used in this study was obtained from the Army Veterinary School, Army Medical Center, Washington, D. C.

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## Safe Milk for a City

Under this title, A. R. Southwood, M. D., presents a peacetime plan of 14 points in the *Journal of Agriculture of South Australia* (June, 1945). The plan would be administered by a board of control which should consist of two consumers, two members of the dairy industry, a member of the department of agriculture, and a member of the department of health. This board would have complete control of the production, the transportation, and the distribution of milk. It would provide for: veterinary inspection to insure the health of the cows, including tests for tuberculosis and brucellosis as well as quarterly physical examinations; examination of all milk handlers to guard against the careless spread of human ailments after the milk was produced; for inspection to insure that good dairy equipment was used, that it was properly cleansed and cared for; and that the milk was tested regularly to insure its purity.

Methods of accomplishing the desired ends are discussed in considerable detail.

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An outbreak of contagious bovine pleuropneumonia involving 10 goats is reported in the *Indian Veterinary Journal* of November, 1945. The goat, the sheep, and the water buffalo are generally regarded as being quite immune to that disease. The diagnosis was made by clinical and autopsy findings.

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Tuberculosis eradication, under the program of the past quarter century, is now saving 16 million lbs. of beef annually, according to reliable estimates.

# Scoffing at Bovine Tuberculosis Eradication

Although in the United States, where computable benefits have been achieved through bovine tuberculosis and piroplasmosis control and measures against brucellosis are in the making, debating with our colleagues abroad over so-called eradication of tuberculosis among farm animals is as pointless as regrettable. Argument can lead only to unproved history, exaggerated statistics, and irrational prophecy. Progress in the mastery of livestock diseases takes long years of education and endless strategy against the bickerings of opposing interests. There is, therefore, considerable regret that the conscientious objectors can still send men of science digging around for testimony to strengthen their cause. Throwing obstacles in the way of animal-disease control is an old game difficult to compass—a game that seems to have kept veterinary medicine all over the world limping painfully behind the rear echelon of man's triumphant march in the field of science.

A well-composed article,[1] for example, published in a journal overseas, goes so far afield as to denounce vigorous control of bovine tuberculosis, actually going so far as to shout alarm at the coming of an era (date not given) when lost resistance (in human beings) to tuberculosis infection through meddling with Nature's way "will be terrible." Quoting:

"The . . . road . . . we shall have to travel [on account of tuberculosis eradication] leads to an unknown future, but through dreadfully familiar country. Country ravaged by war, by soil erosion, by flood, country peopled by millions and ever more millions of human beings, submerged so deeply by inherited or environmental disabilities that disease beyond human hope of elimination must be their portion as far ahead as can be seen."

The shoe fits in all dimensions and we shall wear it; we have long since expunged the archaic autovaccination theory of human self-preservation, and are in agreement with the majority that the name of true resistance to disease is Health.

In self defense, it seems necessary to explain again what we mean by "eradication" in speaking of infectious diseases. The word doesn't refer to the extermination of the given disease. It stems from the work of Theobald Smith. When he discovered the life ring of *Babesia bigemina*, his chief, Dr. D. E. Salmon, declared "Here is a living creature that can be eradicated from the face of the earth." And, it was eradicated from almost every nook and corner of southern United States. If, for example, every country had taken the hunch (that was in 1893), *B. bigemina* would now be as rare as the fabulous Dodo. *Mycobacterium tuberculosis*, taken as another example, will not be so easy to eradicate. But, to cherish the notion that it can't be done, granted that it should be done, is the voice of Human Inferiority, and an open innuendo that man's claim to the captaincy of the living is just a bluff.

The tuberculous New Yorker who infected four successive dairy herds and the slightly higher tuberculous morbidity among Negroes than among whites seem like grabbing at straws to prop the antibody theory of human survival. All that seems to be a quite superficial view of a deep subject, for, in this atomic age, man is not likely to surrender his place on earth to antibodies and, in despair, give up the idea of killing their makers wherever, however, and whenever that can be accomplished.

Developing resistance to disease without the alleged benevolence of harmful microbial life ought not to be, and we believe is not, regarded as out of the range of the biological sciences. In that respect, the phytopathologists and geneticists are atop of veterinary science. They have solved many difficult problems without diddling in the Land of Autovaccination, problems more far-reaching than tuberculosis of cows.

In the United States, bovine tuberculosis eradication and what it represents has brought prestige to the veterinary profession, rich rewards to the livestock farmers, confidence in the meat and milk industries, new colleges of veterinary medicine and bigger appropriations to the old ones, well-filled classrooms, crowded society meetings, and not to be discounted, an unprecedented poundage of animal foods for the prosecution of the war. It is our belief that in the absence of a bold approach to the animal-

[1]Rainey, J. W., C.B.E., M.R.C.V.S.: The Relationship of Bovine to Human Tuberculosis. Vet. J., *101*, (Sept. 1945): 195-198.

disease problems, veterinary medicine is destined to the limbo of the lowly. Preaching that the veterinarian's work may be harmful to mankind is harmful to veterinary medicine and is not true.

## Veterinary Medicine and Animal Husbandry

When the first veterinary faculties were established in Europe in the 1760's, the motive was to provide uniformly trained personnel for animal husbandry—not only for clinical work. The breeding, feeding, and hygiene of farm animals and their products (milk, meat, wool) comprised a major study of the curriculum. In this country a century later, when the first veterinary schools were founded, the course adopted was exclusively medical. Husbandry was ignored for many years and left for the agricultural colleges and livestock associations to develop. The effect on the affluence and prestige of the veterinary profession in livestock circles is self-evident. The difference is between *being in* and *looking in,* and the choice was our own.

## The Veterinarian in Public Health

It is the responsibility of veterinarians to assure that products of animal origin reach the ultimate consumer in wholesome, uncontaminated form fit for human consumption.

The *Veterinary Student,* (summer, 1945, issue) carries an item titled "Veterinary Public Health," in which F. A. Spurrell directs attention to the fact that many individuals assigned to active duty with the Veterinary Corps of the United States Army have expressed surprise when informed that they must learn the specifications covering such items as fresh shrimp, lard substitute, creamery butter, eggs, and poultry, along with the classification of meats.

Here is an instance of a logical service being forced into our field. Rather than have this work come as a surprise assignment, every veterinarian should have realized that products of animal origin were involved and the inspection was therefore appropriately in the veterinary field. The story continues with a wider application of the same kind of failure. As a profession we have not recognized, nor have we acquainted the public with a complete list of the services that veterinarians should and do perform. Such recognition and acquaintance would call attention to the need, which would soon be followed with a wider demand for the service.

The challenge facing the veterinarian in the public health field is that he shall do his full part in presenting all foods of animal origin to the consumer in safe and palatable form.

## Better Milking Methods

Milk should be produced from healthy, clean cows and handled in clean equipment. Diseased udders are responsible for much of the abnormal and low-grade milk rejected at the plant. Trauma of the teats and udder play an important rôle in setting the stage for udder infections; improper milking—either by hand or with a machine—may be a form of trauma.

Cows like to be milked, when they are properly handled, says Dr. Geo. Hopson, of New York City, in *Milk Technology* (July-August, 1945) under the title, "Why Milk Sanitarians Are Interested in Better Milking." Only persons who appreciate cows should milk them, he continues, and such persons should follow some simple rules for producing milk of high quality. The following rules apply to milking-machine technique:

Milk at the same time at every milking; have all equipment ready before milking is started; do not feed cows while milking; prepare the udder with chlorine solution at 130 F.; use a strip cup and observe the first stream; apply the teat cups; remove the milker as soon as milk flow stops; place problem cows at end of milking line; keep milking machines scrupulously clean.

Medicine took its longest stride in all times when, at the turn of the century, it rejected theoretical enigma and began to embrace the physics and chemistry of biological matter and processes.

Snoring is a transitory nocturnal elasticity of the velum pendulum palati unfurled in the pathway of the respiratory current. Therapeutically speaking, it responds only to the dreamless sleep of eternity.

# A Message from a Beef Cattle Breeder

*[The address, from which the following summary was prepared, was delivered by Mr. E. G. Hayward, of Cimarron, New Mexico, before the New Mexico Veterinary Medical Association at Raton, on November 19, 1945. Mr. Hayward is president of the New Mexico Cattle Growers' Association.—The Editors.]*

IN THE field of animal research and in safeguarding the health of the American people, there is no one who has excelled the American veterinarian. His work often has been unrecognized, but the results of that work appear in the pages of history, and will continue to appear there.

The dread of famine stalks those countries in which the basic food of the people is not meat or other livestock products. The country which maintains a flourishing livestock industry, on which a diet composed primarily of foods of animal origin is based, does not face this dread of famine.

Where would we cattlemen be without you veterinarians? Your research and constant vigilance keep our herds free from epizoötics and plagues. For example, you have prevented the dread foot-and-mouth disease from becoming well established, and your close supervision of meat and animal products imported from countries where this disease exists has kept our herds free from it for long periods of time.

Not many years ago, blackleg caused periodic outbreaks and heavy losses because there was no remedy. Scientists in veterinary medicine took up the study and developed a vaccine which effectively controls the disease.

Many of you remember the scourge which threatened the herds of the South—tick fever. The great work of Theobald Smith demonstrated that the tick was the spreader of this disease, and that eradication of the tick left the ranges free from the disease, so that cattle could move freely to all parts of the country.

Let me point out that, among the states which enjoy the greatest freedom from contagious and communicable livestock diseases, New Mexico is in the top bracket, as classified by the United States Department of Agriculture. This enviable position was attained through the efficient and loyal work and coöperation of livestock breeders and veterinarians. The *New Mexico Stockman* has welcomed articles from veterinarians; its pages have carried many stories from state and national veterinary associations and from bureaus of animal industry. We feel that every livestock owner in New Mexico should be informed and educated regarding the ravages of animal diseases and the proper methods of control.

The brucellosis problem faces us squarely right now. Although New Mexico is practically 100 per cent free of this disease, our cattle have been slowed down and even stopped when moving to feeding and breeding establishments in other states. We breeders believe that information available makes it possible to draft a uniform regulation which would pertain to the interstate shipment of breeding cattle to all states of the Union. I should like to see this convention pass a resolution urging the drafting of such a regulation to replace the heterogeneous mixture of conflicting state rulings under which we now operate.

You men of veterinary science have made a great contribution to human health and happiness, and I say, "Hats off to the American veterinarian!"

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## Schools of Public Health

The American Public Health Association is undertaking a program for the accreditation of schools of public health in order that recognition may be given to universities qualified with regard to program, personnel, and facilities to offer adequate courses leading to the degrees of M.P.H. and D. P. H.

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The successful farmer (who farms) has to be a carpenter, mechanic, blacksmith, crop specialist, bookkeeper, veterinarian, doctor, buyer, seller, and manager, who knows when a specialist ought to be employed.

# The Teaching of Veterinary Anatomy

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ANATOMY HAS been often regarded as a subject which is required of all students in veterinary medicine, but which is to be passed and forgotten since, usually, nothing practical has been learned anyway. The learning of exact origins and insertions of muscles, all the prominences and depressions on the bones, the vast amount of detail, footnotes, and small vessel and nerve branches have made anatomy difficult and not too well enjoyed. Everything had been worked out; there was no room for new discoveries. The broadening of the field of anatomy to include histology, embryology, cytology, hematology, neurology, and endocrinology has given opportunities for advancements in research. The term "anatomy" has usually referred to the gross aspects. However, it should be considered to include the other subjects mentioned above.

The tendency has been to reduce the hours devoted to gross anatomy to a minimum so that more time can be assigned to other subjects or to other fields of anatomy. The present course must then be stream-lined and all of the unnecessary and time consuming material excluded. Regularly scheduled lecture periods which usually don't correspond with the laboratory periods, and in which material discussed can be learned better from the animal or readily obtained from the text book, are superfluous. Since gross anatomy can best be learned in the laboratory, necessary lectures or demonstrations may be given as they fit into the laboratory procedure. The lectures or demonstrations may be long or short, according to the demands of the occasion. A complete but not detailed laboratory guide will direct the student as to the dissection procedure, structures to be observed, and references to text book material. This may be supplemented frequently by the laboratory instructors. Drawings of dissections are often profitably made. They need not be artistic masterpieces but should show the structural relationship observed by the student. While investigating the structures of the body, the art of dissection and the handling of instruments will be learned. The physiologic aspects should be determined since form and structure are determined by function. The student should ask himself questions like these: What is this structure and why is it so named? Why is it so shaped and what does it do? How is its structure justified by its functions? Although the cadaver must be used to study body structure, it should be kept in mind that a knowledge of the living body is the objective. Living animals should be employed as "palpators" to allow for the location of deeper structures by external visible landmarks. It has been expressed that the limitations of activities are conditioned by the structural limitations of the physical machine. The body is ever in the process of change and from the time of conception to the time of death, it is never the same at any two stages.

Since form and structure are the most fundamental or basic aspects of medical education, anatomy should be one of the first subjects to be studied. It is probably best to complete it during the first year. The anatomy department has the important duty then of influencing the student along proper lines in his beginning medical education. All phases of anatomy should be thoroughly coördinated. One will help explain the other. This is best accomplished if all of the anatomical subjects are taught in the same department. Research problems involving one phase usually call for equipment and procedures involving other phases of anatomy, which would then be readily available.

In gross anatomy, stress should be placed on the practical considerations that will be used in clinical procedures. Since details are not long remembered by students, the "big things" should be learned. Terminology should be treated in the light of meaning and word analysis. In comparative anatomy, including all the domestic animals, the fact that the animals are

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structurally the same fundamentally should be stressed. Accent should be placed on their similarity, based on embryology, in addition to their differences. In dissecting all the domestic animals, each animal will serve to review the structures of the body. This will accomplish the main objectives which are to get an over-all picture of body structure and to realize fundamental principles of body makeup and the significance of each part and its relationship to the other parts. A good basic knowledge of body structure and not just a conglomeration of details and unrelated facts should be the goal.

With these views in mind, it has been found advisable at Iowa State College to use the dog as the basic dissection animal. All of the students dissect the same portions of the body at the same time. By the end of the first quarter, all have completed the entire dog. This helps in coördinating the teaching of gross anatomy with that of histology and embryology. When the horse was used as the basic animal, it was much later before all had finished the entire horse, since its study was customarily divided into three sections. It is easier for students with little previous knowledge of gross anatomy to study the dog than a large animal like the horse. Larger animals are harder to handle and to keep in condition for good dissecting. In the dog, the structures can be kept intact long after they are first dissected.

The horse has not been greatly deëmphasized, however. Two groups of students are assigned to it with the diaphragm as their junction point. Study of the horse is completed during the second quarter. The students dissect it rapidly and efficiently since they already have a thorough basic knowledge of all of the structures. Stress is placed upon practical considerations, such as the limbs. All of the other domestic animals are studied during the third quarter and are compared to the animals already dissected. Evolutionary and phylogenetic aspects are considered.

In every dissection procedure, all of the systems in the part of the body concerned are studied simultaneously and in relation to each other. The bones are studied along with the soft structures of each area. Topographical and regional anatomy are included. X-ray pictures, charts, lantern slides, and prepared specimens supplement the dissections.

Improved methods of embalming with more expensive fluids than formalin alone are readily applicable to a small animal like the dog. With such embalming, all structures are readily demonstrable. The body does not mummify even while lying on a table for a whole quarter. The use of vats has been discouraged. Refrigeration facilities would be helpful. Since the horse (with the exception of the light horse) has been steadily on the decrease, it is well to realize that more stress than before should be placed on the other domestic animals.

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### Corrigenda

In the January, 1946 (pp. 5-19), issue of the JOURNAL, the following corrections should be made in the article "Studies on Vesicular Stomatitis with Special Reference to a Virus of Swine Origin," by M. S. Shahan, A. H. Frank, and L. O. Mott:

Page 8, table 1, column 2, should read: Normal, Normal, Ind.-C immune,[1] N. J. immune,[2] Normal, Normal, Normal, Normal, Normal, Ind. immune, N. J. immune,[2] Normal,[3] Normal,[3] Normal,[3] Normal, Normal, and N. J.-M immune.[4]

Page 8, line 10, should read "[inoc]-ulated via scarifications with Ind. virus" instead of "[inoc]-ulated via scarifications with Ind.-C virus."

Page 19, reference 7, the volume of the Am. J. Vet. Res. should read 6 instead of 16.

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Milk and its products provide more than three fourths of all the calcium in the diet of the people of the United States. A distinct improvement in the human diet is therefore reflected by the increased consumption of milk—from 0.89 pint in 1939 to 1.1 pint per day per person in 1945.—*National Dairy Council.*

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"King," a bull from the Northern Illinois Artificial Breeding Association, has sired 15 daughters from cows of known production. The heifers produced an average of 15,228 lb. of milk and 535 lb. of butterfat, which was 112 lb. more fat than the dams averaged.

# Metrazol in Small Animal Surgery

F. R. BARTLOW, D.V.M.

*Indianapolis, Indiana*

A Low surgical mortality reflects more than skillful operative technique. It also indicates that the surgeon judiciously prepared his patients for operation and that anesthesia was safely induced. In addition, and equally important, anesthetic and surgical emergencies were successfully combatted and the best means of protecting against postoperative hazards were employed.

For the purpose of this discussion, let us acknowledge the skill of the veterinary surgeon and assume that his patients receive the usual preoperative care. Let us also assume that the operative cases of one surgeon average about the same as those of other surgeons. Why, then, does not each surgeon have the same surgical mortality? I believe that the answer lies in the state of the central nervous system before, during, and after the operation.

The vagal, vasomotor, and respiratory centers are the primary governors of heart rate, blood pressure, and breathing. Other brain centers, located in the cerebral cortex, control the level of consciousness and all voluntary muscular activity. When one or more of these centers are dangerously depressed, the threat of death exists.

Many preoperative patients are poor surgical risks because of direct or indirect disturbance of the central nervous system. Old, debilitated, and toxic animals usually have inadequate cardiac, circulatory, and respiratory reserves. The very young and the delicately bred tend to have unstable nervous systems that are as easily depressed as they are easily stimulated. The injured often are in a state of traumatic shock with marked failure of the peripheral circulation. In all such cases, the existence of central nervous depression must be at least strongly suspected. And, unless the central nervous system is supported before operation, these animals may fail to withstand the added shock to respiration and to the circulation by the preanesthetic medication, the anesthetic agent, and the trauma incident to surgery.

Sudden development of respiratory failure during operation is usually due to the action on the respiratory center of the opiate or barbiturate given prior to anesthesia and of the anesthetic, whether an injectable barbiturate or ether. To combat this failure, stimulants, such as picrotoxin, coramine, and metrazol, are given. I prefer the latter because its effect on the respiration in these cases is striking and at times almost phenomenal. Often, a noticeable increase in the rate and depth of respiration is evident before the complete dose has been injected into a vein.

In addition to respiration, circulation must also be considered. Circulatory inadequacy during surgery probably occurs more often than we realize. Unfortunately, the veterinarian has no easy and accurate means of quickly determining the blood pressure of his patients. The sphygmomanometer of the surgeon who operates on the human patient has revealed much information regarding blood pressure changes that take place during anesthesia and surgery, and this knowledge is being used to reduce human surgical mortality. Veterinary surgeons should also be able to use this same knowledge of blood pressure changes to the benefit of mortality.

Anesthetic depression of the vasomotor center is a frequent cause of circulatory failure during operations. Beecher[1] has stressed that, "Anesthesia can knock down the body's defenses and transform a compensated circulatory system into an inadequate one, with the result that profound shock appears in individuals previously not

in shock." The truth of this statement becomes evident when we consider the fact that approximately one-half of the fatal dose of an anesthetic agent must be given to induce surgical anesthesia in an animal that has a normal tolerance for the drug. It would be doubly true in the case of an animal that has less than normal tolerance for the anesthetic. Furthermore, the circulation would be even more apt to fail if the vasomotor center was being simultaneously depressed by nervous impulses set up by trauma and operative manipulations. Here, again, we find depression of the central nervous system a potential source of surgical mortality. And, again, a central stimulant is the logical means of overcoming the central depression.

Well-defined depression of the central nervous system also exists during the early postoperative period, primarily because of the continued and combined effects of the preanesthetic medication and of the anesthetic. During this time, the centers of the cerebral cortex that have to do with consciousness and voluntary muscular activity are still "blacked out." In addition, the respiratory and vasomotor centers may be so depressed that they can only precariously control breathing and blood pressure.

It is quite understandable that insufficient cortical and medullary center function during the postoperative period would be a significant factor in surgical mortality. Occasionally, an untreated or inadequately treated animal does not awaken from anesthesia. Others recover very slowly—and this is potentially dangerous because unduly delayed recovery from anesthesia postpones the return of normal reflexes and muscular activity. It also prolongs the period during which breathing is poor and the lungs are not being properly ventilated, and it keeps the circulation sluggish longer than is safe. These conditions are among the causes of postsurgical deaths from hypostatic pneumonia as well as from thrombosis and embolism. So again, we must overcome potentially lethal central depression, and this can be done by using a central stimulant.

Possibly, the most disconcerting cause of mortality is circulatory collapse occurring several hours after an apparently successful operation, or even several days later while the patient seems to be uneventfully convalescing. The cause of such delayed postoperative shock has not been definitely determined. Whatever the direct cause, I consider it advisable to guard against failure of vasomotor center control over blood pressure by giving metrazol for a period after the operation.

Inasmuch as central nervous system depression can be included among the major causes of surgical mortality, central stimulant drugs are invaluable aids in helping to prevent such deaths. The question is, which one is most valuable? Pharmacologists tell us that drugs which stimulate differ widely as to site and mechanism of action and that only a few of them are clinically useful. It is evident that the surgeon's stimulant must act chiefly on the respiratory, vasomotor, and cortical centers. It must be a pure stimulant, not one that first stimulates and then secondarily depresses. It must be powerful enough to overcome even deep depression, yet be safe to use. It also must be a drug for which the patient does not quickly develop a tolerance.

My choice of a stimulant was based on a process of elimination after clinical trial. I quit using camphor, strychnine, and caffeine-sodium benzoate a long time ago. I found picrotoxin too toxic. Then I evaluated nikethamide, amphetamine, and metrazol. I decided that the latter best fulfills the previously enumerated requirements for a centrally-acting stimulant. This decision was substantiated by Goodman and Gilman's[3] description of this drug in their textbook, "The Pharmacological Basis of Therapeutics." They state: "Metrazol is a synthetic compound which possesses to a high degree the property of stimulating the central nervous system. Its action is primarily on the higher centers but all parts of the cerebrospinal axis are stimulated to some degree. The medulla also shares in this stimulation. Respiration is markedly increased by large doses of metrazol. The vasomotor and vagal centers of the medulla are likewise stimulated. The analeptic action of metrazol on the higher centers of the central nervous system is evident from its ability to counteract depression produced by hypnotic drugs. This is prominent when directed against depression caused by barbiturates, avertin, paraldehyde, and chloral hydrate. So marked is the antagonism of metrazol to avertin that experiments have been described in which animals with complete motor paralysis have been restored to normal immediately after the administra-

tion of metrazol. Not only is motor activity restored, but failing respiration and circulation are stimulated through the medullary action of the drug . . . . Metrazol is a relatively nontoxic drug in so far as the amount necessary to produce poisoning is concerned." An excellent account of an experimental and clinical study of pentothal-metrazol antagonism and a description of a method for shortening the recovery period following pentothal anesthesia by means of metrazol was published in the April, 1945, issue of *Annals of Surgery*. This study was conducted by Kenneth L. Pickerell, M.D., of the department of surgery, Duke University, and Richard K. Richards, M.D., of the department of pharmacology, the Abbott Laboratories.

I give the drug intravenously in emergencies to get its fullest and quickest effect, although it works fast and well when injected intraperitoneally or subcutaneously. When estimating the required dose, I take into consideration the size of the patient, how the breed of animal reacts to medication generally, how deeply the patient is depressed, and the purpose for which the stimulant is being given. A smaller dose is required preoperatively to support respiration and circulation than is injected during the operation to combat collapse. Similarly, a smaller dose is given after the operation to bring back normal reflexes, deepen breathing, and improve the circulation than is injected following a minor operation or a tooth extraction to fully arouse an animal so that the client may take it home.

When a dog is a poor surgical risk, metrazol is injected thirty to forty-five minutes before the operation.

*Case* 1.—Patient: Collie, 8 years old, weight 40 lb.

Diagnosis: otitis interna of two years standing. Septicemia from incomplete drainage and absorption of pus.

Preanesthetic Medication: Because of existing toxemia, the patient obviously was a poor surgical risk. The client was advised of this, but sentiment prompted him to request that the operation be performed. About forty-five minutes before the operation 2 1/2 cc. of metrazol was injected intravenously.

Anesthesia: About 3 gr. of nembutal was required to produce surgical anesthesia. The injection was made slowly, and the patient was closely watched for symptoms of anesthetic depression. No significant respiratory or circulatory depression developed, and the operation was without incident.

Postoperative Medication: 2 cc. of metrazol was injected intravenously at the end of the operation. This same dose was injected subcutaneously every two hours until consciousness returned. There was no postoperative respiratory depression or delayed shock. It is exceedingly doubtful that without support of the respiration and circulation during and after the operation this patient would have survived anesthesia and surgery.

During the operation, to combat anesthetic and surgical emergencies, I give an animal weighing up to 20 lb. 1 cc. of metrazol intravenously. A larger animal may need 2 cc., or even 3 cc., if it is deeply depressed. I do not hesitate to give larger and repeated doses when a patient's condition demands them.

*Case* 2.—Patient: green African ape, 3 years old, weight 20 lb., obviously in pain and highly excited.

Operation: extraction of tusks.

Anesthesia: 4 cc. of pentothal sodium, injected intraperitoneally. Intravenous administration was impossible due to difficulties of proper restraint. Before surgical anesthesia was attained, there was sudden and virtually complete collapse of the circulation. The pulse was so rapid and thready that it could not be accurately counted. The respiration also was significantly depressed.

*Emergency treatment*: Difficulties of restraint no longer existing, 2 cc. of metrazol was injected intravenously, and the circulation and breathing were quickly restored. The patient now being out of danger and satisfactorily anesthetized, the extractions were made.

Postoperative medication: 1 cc. of metrazol subcutaneously every two hours for four doses. Shortly after the last injection consciousness returned as suddenly as it was lost. The postoperative course was uneventful.

The postoperative dose of metrazol needed to awaken a dog from nembutal, evipal, avertin, or pentothal sodium anesthesia I found to be 2 or 3 cc., intravenously. However, the exact dose required will depend on how the animal responds.

The possibility of giving an overdose of this stimulant, particularly in a state of depression, is not great as there are unmistakable warnings of entry into the range of toxic dosage. The first of these is twitching of the muscles. If injection of the drug is stopped at this point, the twitching quickly stops. If injection is continued past this point, the next evidence of toxicity is convulsion. If injection is stopped at this point, the convulsion, too, subsides. Injection of metrazol must be carried considerably beyond the point of convulsion before the

lethal dose is reached. Occasionally, I have seen this twitching and on one or two occasions, where the injection of a larger dose was made very rapidly and intravenously, I have seen a convulsion, but I have never known of a death from an overdosage of metrazol.

*Case* 3.—Patient: Boston Terrier, 6 years old, and obese. This dog had been struck by a car, had sustained a bad cut on the head but no fractures, and was in a state of shock when brought in by the owner.

Anesthesia: An intravenous dose of 1 cc. metrazol so completely overcame the traumatic shock that it was not necessary to delay induction of anesthesia with intravenous pentothal sodium preparatory to taking care of the cut. Inasmuch as the client wished to take the dog home after the wound had been treated, 2 cc. of metrazol was injected intravenously after my work was completed. Within a few minutes consciousness was regained and the patient was on its feet. The owner was given four metrazol tablets and directed to administer orally one of the tablets every three hours.

When the reason for giving metrazol following surgery is to tone up the central nervous system as protection against postoperative complications, I inject 1 cc. as soon as the operation is over. Then I give 1/2 to 1 cc. every hour or two until three or four doses have been given. Should stimulation be required beyond this point, I continue with smaller doses at less frequent intervals.

*Case* 4.—Patient: French poodle, 4 years old, weight 45 lb.

Diagnosis: renal calculi.

Preoperative condition: satisfactory.

Preoperative medication: 1/4 gr. morphine sulfate.

Anesthesia: surgical anesthesia attained by slowly injecting intravenously 6 cc. of pentothal sodium solution. Before the needle had been withdrawn from the vein and without forewarning the patient suddenly became profoundly depressed. Respirations became exceedingly shallow and very slow. The pulse was weak and fast.

Emergency treatment: Metrazol was injected through the same needle used for the anesthetic, which had not yet been removed from the vein. By the time 2 cc. had been given the breathing was deep and of normal rate, and the pulse was slowed and strong. The operation was completed without further incident.

Postoperative course: Although at no time during the operation was anesthesia deeper than was desirable, in view of the patient's initial bad response to the anesthetic it was considered advisable to protect the animal against another episode of respiratory-circulatory failure. To accomplish this, 1 cc. of metrazol was injected intravenously at the close of the operation, and then 1 cc. was given subcutaneously every two hours during an eight hour interval. Recovery was uneventful, and the patient went home on the fifth postoperative day.

For a cat, the dose of metrazol will be about one-half that given to a smaller dog—1/4 cc. to 1/2 cc. to prepare the cat for operation and 1/2 to 1 cc. to combat depression during and after the operation.

## CONCLUSION

Central nervous system depression can be a cause of surgical mortality. Uncorrected central depression of respiration and circulation make the preoperative patient a poor surgical risk. The surgical mortality is also increased by failure to overcome respiratory and circulatory emergencies that arise during operations. Central depression in the postoperative period is responsible for delayed recovery from anesthesia, slow return of normal reflexes and muscular activity, shallow breathing and deficient oxygenation of the blood, and sluggish circulation. These, in turn, predispose to hypostatic pneumonia, thrombosis and embolism, delayed circulatory failure and other causes of postoperative deaths. Surgical mortality can often be avoided by proper support of the central nervous system through controlled stimulation.

Metrazol is the drug that best fulfills the surgeon's requirements for a central stimulant that will reduce surgical mortality attributable to central depression. It improves the pulse, blood pressure, and respiration and helps support the patient during and after the operation.

### References

[1]Beecher, H. K.: The Choice of Anesthetic for the Seriously Wounded. J. Am. M. A., *121*, (1943): 899.

[2]Goodman, Louis, and Gilman, Alfred: The Pharmacological Basis of Therapeutics. The Macmillan Co., New York, 1941.

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A high-speed camera with self-contained light and easy to use has been perfected for taking pictures of surgical operations.

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"Blue babies," the disease of newborn infants due to subnormal blood supply to the lungs, has been successfully cured in many instances by joining a branch of the aorta to the pulmonary artery.

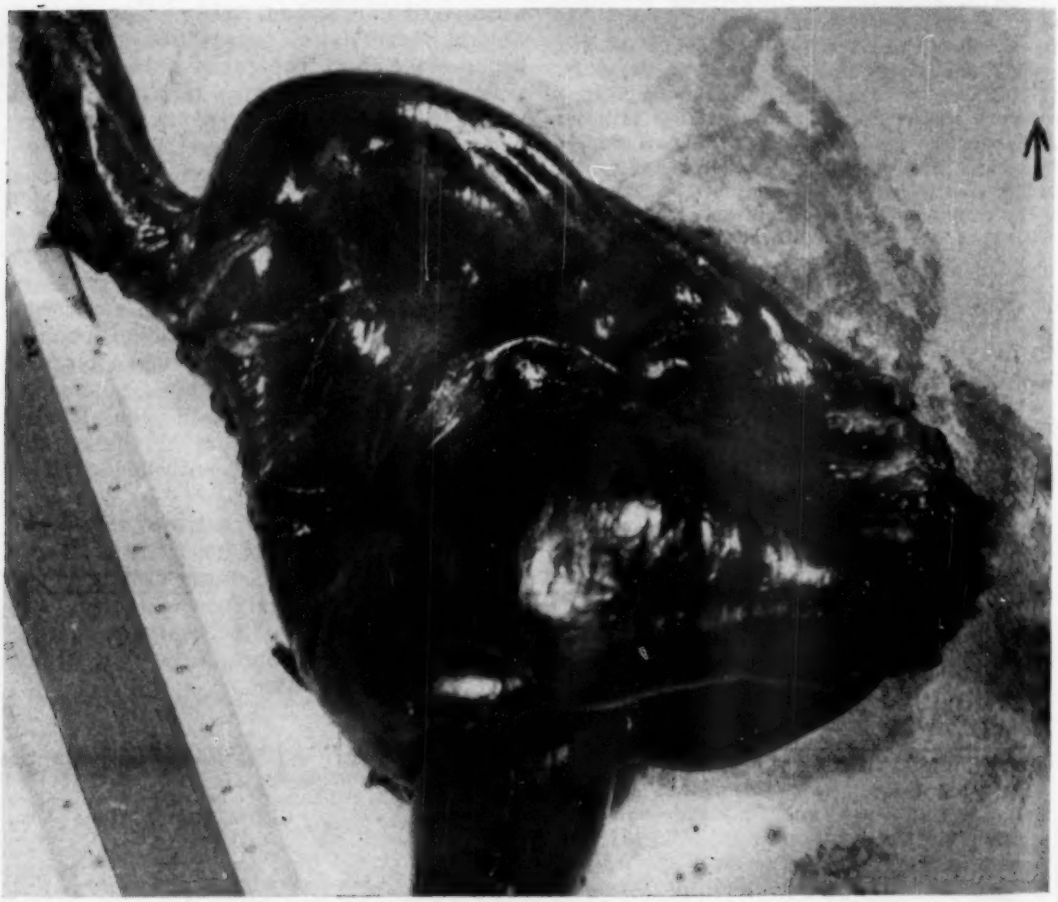
# Intussusception of the Stomach of a Dog (Case Report)

CAPTAIN HAROLD BURSTEIN, V.C.
*Norfolk, Virginia*

A LARGE, black, mongrel dog, 4 years of age (an Air Corps mascot), that had been taken care of by our clinic for about two years, was brought in this time with the following history:

The dog had been vomiting almost every hour for about two days, refused food, took a little water; there was no evidence of bowel movements, and the animal showed general malaise.

There was scarcely anything unusual from our own observation. The skin was dry, there was some evidence of dehydration, the behavior was generally sluggish; temperature 101.8 F., respiration 16, pulse regular. Abdominal palpation showed some tenseness but no unusual tenderness, the vomitus was yellow-green with some little undigested material. Rectal examination was negative.



Intussusception of Stomach of a Dog

The absence of pain, any palpable enlargement, elevated temperature, or toxicity, eliminated for the time being the

At the time this case report was prepared, Captain Burstein was Base Veterinarian at Norfolk Army Base, Norfolk, Va.

suspicion of intussusception and suggested nothing more unusual than gastritis.

First, the dog was given a course of calomel of 1/4 gr. in 4 doses of 1/16 gr. each, at intervals of twenty minutes, after which an enema was given. Very little fecal matter was evacuated. A stomachic of nux vomica and gentian was prescribed.

The dog was returned the following evening in a very poor condition. The temperature was subnormal and the veterinary technician on duty administered some dextrose, intravenously. After two hours following severe hematemesis the dog died.

*Postmortem Findings*:—On postmortem examination, a very interesting condition was found. There was blood in the peritoneal cavity and most of the visceral surface of the stomach and duodenum was covered with coagulated blood; ecchymotic hemorrhages were found in the stomach wall proper. The pyloric area was solid to the touch and seemed to have what was felt at first to be a neoplasm. Upon removal, it was observed that the pyloric end and that of the duodenum were definitely intussuscepted about 2 in. into the upper part of the stomach. The latter was devoid of any contents, with the cardiac mucosa congested and the pyloric end as well as the intussuscepted section looking like a currant jelly glistening clot. The stomach wall in that region was about 1 in. thick. On washing the inner surface, it was found that most of the hemorrhage was submucosal, continuing throughout the folds of the intussuscepted section and running through the submucosa of the duodenum. No foreign body was found and no evidence of any external trauma. A neoplasm was still suspected.

The Marine Hospital Pathologic Laboratory, Norfolk, Virginia, photographed the specimen and sectioned all the tissues. The stomach tissue revealed nothing but a fresh submucosal blood clot and the visceral sections showed no pathologic symptoms whatever.

### DISCUSSION

No reference in the available literature to intussusception of the stomach has been found. We believe that in this particular case we were dealing with a hemorrhagic phenomenon rather than an intussusception in the true sense. Either because of the catharsis or for other unknown reasons, a severe hemorrhage in the submucosa region forced the pylorus and the immediate adjoining gastrointestinal tract into the upper part of the stomach, or if the hemorrhage was secondary to the intussusception with a resulting gastritis, we have an unusual condition, the reasons for which are unexplained.

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## A Technique for Castrating Dogs

Although veterinarians are not frequently called on to castrate dogs, when they are it is advisable to avoid untoward sequels. This operation, generally, is performed in two ways: the closed operation or the open operation. The open operation entails incising the tunica vaginalis and exposing the testicle, with ligation and removal. The open operation does not expose the testicle. The tunic is ligated and all the structures enclosed are removed.

When called upon to perform this operation, I have used both methods and have had untoward results from both. In my experience, these untoward results have been abscesses forming along the inguinal canal, which later point, then rupture and evacuate large collections of a serum-like pus. This aftermath is not conducive to prestige. The above condition manifests itself in four to seven days after an operation. When the dog is sent home, there are no symptoms of any impending trouble. Later, four to seven days, the above mentioned aberration appears. Though not all castrations have this sequel, the proportion is large enough to seek some other technique to eliminate them.

The tunica vaginalis of the dog is a flask-like serous sac which extends through the inguinal canal to the bottom of the scrotum. Like the abdominal peritoneum, of which it is an evagination, it consists of two layers: the parietal and the visceral. The parietal lines the scrotum below. Its narrow tubular part lies in the inguinal canal and is continuous with the parietal peritoneum of the abdomen at the abdominal inguinal ring. Normally, it contains a small quantity of serous fluid. The visceral layer covers the spermatic cord, testicle and epididymis.

A study of the inguinal region of the dog

revealed that a variation in the technique of castration was necessary.

*Technique.*—The usual surgical procedure is followed. For anesthesia, we prefer morphine and atropine followed in thirty to forty minutes with nembutal (half dose), intravenously. We scrub the parts thoroughly with soap and water, then dry. The operative field and adjacent parts are covered with alcohol and this is also allowed to dry before proceeding.

The testicle is grasped between the thumb and finger to tense the skin. When the incision is made down to the testicle, the tunica vaginalis retracts upward. At this point, a forcep is applied to the testicle and handed to the assistant who tenses the cord and exposes as much of it as is possisible. The cord containing the vessels and nerves is litigated with catgut, crushed distal to the ligature and then removed. After the removal of the cord, there remains the parietal portion of the tunica vaginalis that is obstructing the canal. This part is picked up with forceps and with gentle traction and a scraping movement of the scalpel is removed. The canal is now free from all obstruction and what is left of the tunica vaginalis is the visceral part that lines the canal adherent to its walls. This allows free drainage for the parts so that no accumulation can result, which permits healing to be rapid, usually by primary union.

Since this technique has been used on 21 dogs, ranging from Pekingese to German Shepherds, all have made uneventful recoveries.—*S. E. Taylor, D.V.M., Mansfield, Ohio.*

## Increasing Resort to Artificial Breeding

In some countries, artificial insemination has been practiced on a large scale in the past few years. In 1936, Russians reported that 60 million cattle and sheep had been artificially bred. In 1936-1937, 900 cows in Denmark were bred from one bull. England has now eight or nine artificial insemination centers, where bulls are selected on the performance of their progeny, if old enough; if young, on the performance of their ancestors. They are tested for tuberculosis, brucellosis, and as far as feasible for trichomoniasis and for the volume, density, fertility, and keeping qualities of their semen. The Agricultural (artificial insemination) Bill passed Nov. 14, 1945, provides for the furtherance of the project in England, Wales, and Scotland, particularly in respect to application at the centers created. Results have been 50 to 60 per cent of conceptions from first inseminations and over 90 per cent from three, but there is still a high incidence of infertility in some regions. The work is giving a clear picture of infertility and its causes.—*Editorial, The Vet. J., 102, (Jan. 1946)*: 1-2.

## A Successful Unilateral Thyroidectomy in a Dog

In September, 1946, a 7-year-old Pointer was presented to me with a huge enlargement in the inferior cervical region. The history revealed an injury to the head and neck, suffered a few months previously. No general symptoms were observed.

By careful palpation, I was able to determine the extent of the enlargement, and to d i a g n o s e the condition as a unilateral, fibrous goiter. The other lobe of the gland appeared normal. As the affected gland was about seven times larger than normal, I advised its removal.

The preoperative procedure consisted of shaving the skin over the area, and painting the same with tincture of metaphen. Pentobarbital sodium was administered intravenously for general anesthesia.

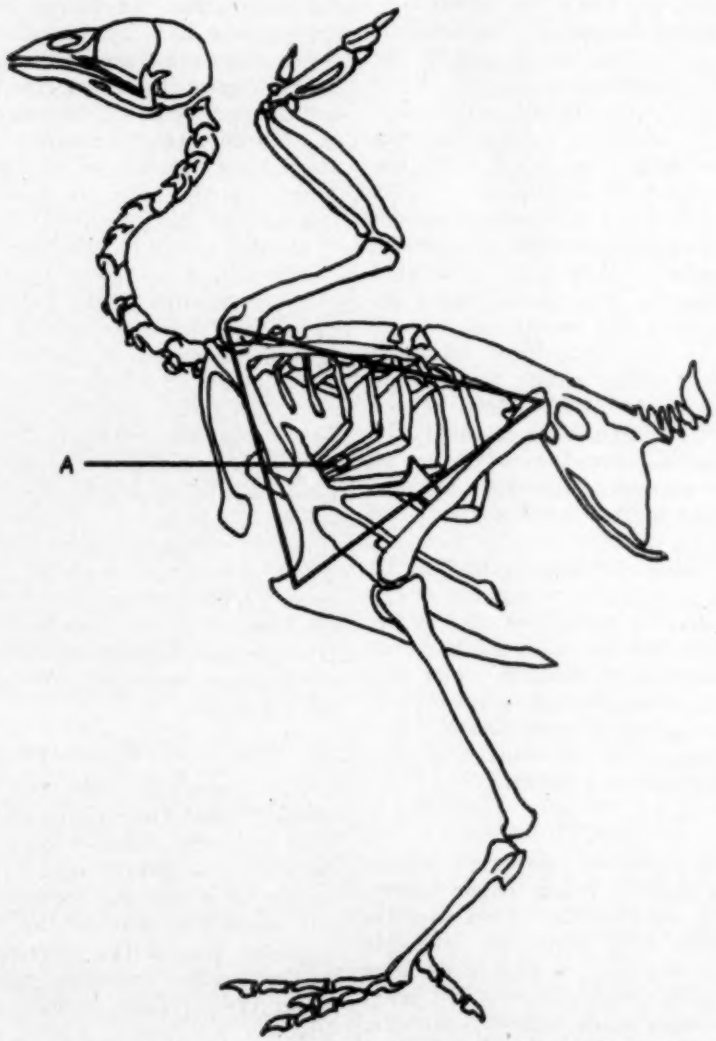
A transverse incision was made across the surface of the growth. The gland was dissected free and the pedicle, ligated with multiple sutures of catgut. The gland was divided about three-fourths of an inch from the ligature. The wound was dusted with sulfanilamide powder and closed with surgical clamps, inserted at intervals of three-eighths of an inch, leaving one extremity of the incision open. A strip of antiseptic gauze, introduced into the wound through this opening, established drainage. After four days, the ligature was removed and the surgical clamps replaced. The incision healed without complications; the clamps were removed ten days following the operation, and an uneventful recovery occurred. A faint scar from the incision resulted, which, I feel, will hardly be perceptible in the future.—*J. R. Wadsworth, V.M.D., Wytheville, Va.*

The author is now an assistant instructor of surgery in the School of Veterinary Medicine, University of Pennsylvania.

# A Technique of Heart Puncture in the Chicken for Obtaining Blood

PAUL GENEST, M.V.
*Quebec, Canada*

SEVERAL METHODS of bleeding poultry through the heart have been described in the literature.[1-4] None of these, however, seem simple and safe enough where the operation must be repeated frequently: Either the localization of the heart is ill defined or the needles recommended are of a dangerously large gauge.




*—From a drawing by the author*

Fig. 1—Orientation points for heart puncture in fowl.

From the Department of Biology, Faculty of Sciences, Laval University, Quebec, Canada.

As a recent experiment on poultry, undertaken in this department, required sev-

eral blood samples from each individual at rather short intervals, it became necessary to devise a more efficient bleeding technique. For that purpose, a method based on that of Gutowska and coworkers[2] was developed.

## PROCEDURE

The bird is placed on its right side, with head toward the left of the operator and is held in place by a helper facing the operator. If no helper is available, a wired frame to which the bird is tied by its head, wings, and legs, can be used.

In this position, the heart lies in the center of the triangle formed by the head of the humerus, that of the femur, and by the anterior end of the sternum (fig. 1). The left ventricle lies immediately under that point (fig. 1, A) which is located between the fourth and fifth ribs, level with the lower third of the costal cartilage.

An area of 2 to 3 cm. in diameter should be plucked free of feathers and disinfected. A 20-gauge needle 1 1/2 in. long is inserted perpendicular to the skin, at the point described above, until the heart beat can be plainly felt. As the first drops of blood appear at the hub of the needle, the syringe is attached and the amount of blood needed is drawn. It is important to hold the piston while pulling out the needle so as to prevent the escape of blood in the tissues. The whole operation takes about one minute.

To prevent blood clotting in the needle and to proceed aseptically, Calmette *et al.*[5] suggest the following technique: Bathe the needles for about two hours in a 3 per cent chloroform solution of paraffin, then dry them at 37 C., after having placed them in sterile tubes plugged with cotton. The chloroform evaporates and leaves a thin layer of paraffin on the needles.

## DISCUSSION

The method described above is simple and relatively safe. From each experimental chicken, at least ten blood samples have been taken with three-day intervals between each operation. A few birds have been bled up to 20 times, and over 200 heart punctures have been made by this technique. Only 1 of these birds died from hemorrhage and that was during the sixteenth operation, although another did show transitory symptoms of hemorrhage after the twelfth heart puncture.

Eight hens were sacrificed to study the effects of repeated probing upon the heart. Most of them showed only tiny scars on the myocardium. One bird had an old clot, 5 mm. in length on the heart muscle, the remains of a hemorrhage unsuspected while the hen was alive. On the subject which had shown symptoms of hemorrhage during the twelfth puncture, a blood clot 20 mm. in diameter, due to a rupture of the coronary vessels, was found.

It is believed that heart puncture is safest and easiest when done through the center of the left ventricle with needles of optimum size. In fowls, the heart rests on its long axis against the sternum, between the second and sixth ribs. Its upper border draws a slanting line from the lower end of the second rib, through the middle of the fourth costal cartilage, to the chondrosternal articulation of the sixth rib. The heart is covered, up to the fifth rib, by the left lobe of the liver.

According to Nicolle and Lebailly,[1] the needle should be inserted between the third and fourth ribs. This, however, endangers the coronary vessels which might be accidentally ruptured. Other workers[2-4] recommend puncturing between the fifth and sixth ribs. In doing so, the liver might be injured and, moreover, the needle when inserted perpendicular to the skin can only penetrate the heart at the top of the ventricle which is very narrow at that level, thus rendering the operation difficult.

On the other hand, a 20-gauge needle seems large enough to permit a prompt drawing of blood, even without anticoagulant, so that larger needles are not advisable because they only add to the danger of the operation.

## SUMMARY

An improved technique for obtaining cardiac blood from the chicken is described. The heart is reached from the left side, between the fourth and fifth ribs, in the center of a triangle formed by the head of the humerus, that of the femur, and the anterior end of the sternum.

The method permits repeated sampling from an individual without endangering its life.

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## My First Stader Splint

On Sept. 1, 1945, a female dog, 2 years old, and weighing 15 lb., that had been hit by an auto, was brought to the hospital. Upon examination, the left femur was found to be fractured at about the middle third.

The owner decided on euthanasia because it would cost too much to have the leg set.

Fractured femur set with the Stader splint.

The next day, we (another doctor and myself) decided to put on a Stader splint and as he had put on several, he turned the operation over to me.

The leg was shaved, cleaned, and a good skin antiseptic applied; then the animal was anesthetized with 3 cc. of phenobarbital sodium.

Under strict asepsis, the Stader splint was placed on the leg. The fluoroscope was used as an aid to adjust the splint so as to bring the broken ends into apposition.

Sulfathiazole and a urea cream were placed around the wounds made by the pins and then sterile gauze wrapped around the pins. The pin wounds were dressed every day for a week and then every other day. The dog was placed under the flouroscope every few days to make sure the bones were in the correct position. The splint was removed around the twentieth day. There was no infection. The temperature and appetite remained normal.

The dog was given back to her owner, much to the joy of both owner and dog.

The dog was posed for the accompanying photo the day after the splint was applied. — *Joe Ridgway, D.V.M., Ventura, Calif.*

## Notes on Chloral Anesthesia*

Satisfactory surgical narcosis in swine can be promptly obtained from intraperitoneal injection of 5 per cent chloral hydrate solution dosed to provide 2 grains per pound of body weight.

The use of cocaine intravenously to shorten the duration of postoperative chloral anesthesia was recommended in 1937 by Professor Cocu of Alfort in describing chloral anesthesia in horses.

The intravenous dose of chloral hydrate for surgical anesthesia in cattle should range around 10 Gm. per 100 kg. of body weight (150 gr. to 220 lb.) in 10 per cent normal saline solution. The maximum safe dose is 12 Gm. per 100 kg.

A chloral solution for surgical anesthesia in dogs should contain 130-140 parts of chloral to 1,000 parts of isotonic saline solution citrated with 1/4 the weight of the chloral and dosed so as to provide 12 Gm. per kilogram of live weight. Revival is rapid and almost complete in an hour.

Chloral is not a good surgical anesthetic for sheep. In doses of 12 to 15 Gm. per 100 kg. of live weight, sensibility is variable and narcosis irregular. Ethobutyl-ethylmalonylurea is preferable for sheep. The maximum dose is 1.75 cg. to 2 cg. per kilogram of body weight. It is indicated for all interventions in the ovine species. The anesthetic state lasts twenty-five minutes.

*Abstracts from *Rev. Path. Comp.*, 45, (July-Aug. 1945): 269-270.

# The Role of Disinfection in Veterinary Medicine
# I. Sterilization of Surgical Instruments

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Instruments are sterilized by one of the following methods:

*Heat.*—(1) Moist heat: boiling, steaming, steam under pressure.

(2) Dry heat: baking, heating in oil, flaming.

*Chemicals.*— (1) Cresolic compounds: liquor cresolis saponatus, lysol, amphyl.

(2) Cationic detergents: zephiran, roccal, phemerol, hyamine.

(3) Mercurials: mercury oxycyanide, merthiolate, metaphen, merphenyl nitrate.

(4) Miscellaneous chemicals: formalin, ethyl alcohol, isopropyl alcohol.

(5) Hot solutions of chemical disinfectants.

(6) Fumigation with gases or vapors.

## Preliminary Cleaning

Whatever technique is employed for sterilization, preliminary cleaning is important. Only instruments so designed that they can be taken apart and cleaned should be purchased. Contaminated teat tubes are particularly difficult to clean and to sterilize. Rusty instruments cannot be cleaned. None of the usually practiced procedures will sterilize an unclean instrument in which pathogens are protected by dried pus, blood, and débris, while even the more superficial techniques have given reasonably satisfactory results when preceded by careful cleaning.

Soiled instruments placed in water containing 1 rounded teaspoonful of trisodium phosphate per quart, (about 1%), and this heated to boiling, become clean and bright. If removed from the solution while hot, only a superficial wiping with a clean cloth to remove shreds of tissue is necessary to prepare them for dry storage. Prolonged heating in this solution is neither necessary nor desirable, and if the procedure is properly carried out, the cutting edges will not be injured nor the finish dulled. Prolonged boiling or allowing the instruments to remain in the solution will result in electrolytic action and corrosion. Slightly greater protection against rusting is obtained by using recently boiled water which contains little dissolved oxygen or by adding a few crystals of sodium nitrite to the solution.

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## Moist Heat

Moist heat sterilization is accomplished at lower temperatures and more rapidly than dry heat sterilization. This is because: (a) Moist heat kills bacteria by the denaturation of their proteins, while they resist dry heat until their cells are oxidized or charred. (b) Hot water heats by direct contact and steam transfers its heat of vaporization as it condenses upon colder objects. In contrast, hot air conveys heat less rapidly and dry heat penetrates slowly.

Boiling instruments for a few minutes immediately before use has given reasonably satisfactory results in the hands of many surgeons, although if protected from wetting by dried debris, the spores of many bacteria can survive the heat attained by boiling. The nonpressure type of instrument "sterilizers" are simply instrument boilers or steamers. Boiling a clean instrument, where no pathogens are protected in crevices or joints, usually is sufficient to kill all nonsporulating organisms which are not thermophiles. Only in those cases where the instruments have been exposed previously to infection with such resistant sporulating pathogens as *Bacillus anthracis* or *Clostridium tetani*, or to such gas producing organisms as *Clostridium edematiens* or *Clostridium septicum*, will there be a significant hazard of surgically important organisms escaping destruction. Nevertheless, it should be borne in mind that many of these organisms are soil residents and may easily be brought into contact with instruments.

Steaming has no bactericidal advantage over boiling because steam not under pressure cannot have a higher temperature than boiling water at the same altitude. While the submersion of clean instruments in boiling water practically assures exposure to moist heat at that temperature, air pockets may interfere with the free penetration of steam, thus giving lower efficiency.

affords bacteriological protection for the sterilized materials during storage. Cellophane is impervious to steam and should not be used. Also, placing scalpel blades, needles, teat tubes, or cotton pledgets in covered jars prevents direct contact with the steam and practically assures that sterilization will not be accomplished. Even placing such containers upright without a cover is sufficient to allow an air pocket

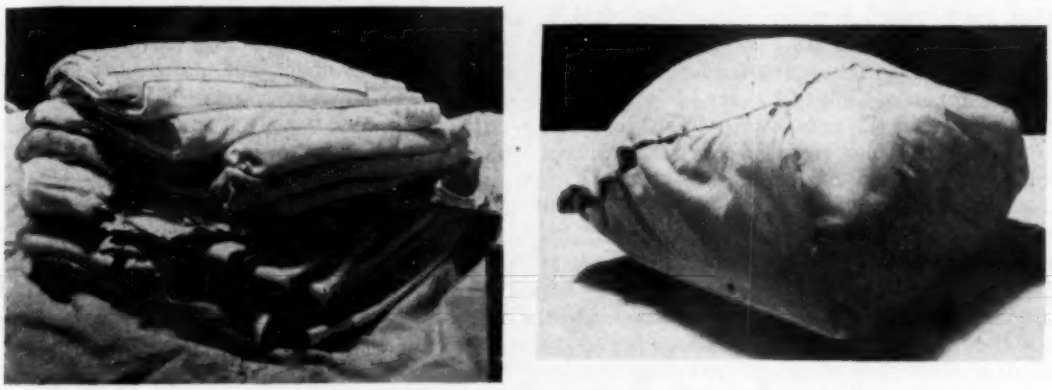

Fig. 1—A well-designed pack for routine steam pressure sterilization. This pack contains five gowns and measures 12 by 12 by 20 inches. Larger packs are difficult to sterilize. For dry heat sterilization, single gowns are wrapped in paper.

The temperature of boiling water and steam not under pressure decreases with increasing altitude, and both are less reliable germicides at high elevations.

Steam under 15-lb. pressure, giving moist heat of 121 C. (250 F.), continued for fifteen minutes in a properly designed and operated sterilizer, assures absolute sterility of previously cleaned instruments. Failures can be traced to improperly designed sterilizers or to inexperienced operators who frequently fail to use good sterilizers properly. Hoyt, Chaney, and Cavell[1] found that in a properly operated autoclave the spores of clostridia were killed in ten minutes by 115 C. (239 F.) moist heat, which is attained at sea level by 10-lb. steam pressure.

*First*, all equipment to be sterilized must be packed so that the moist steam has free access to every portion (fig. 1). Packing into too large packs or rolls may protect the inner portions from contact with the steam and thus prevent sterilization. Wrapping in ordinary wrapping paper allows the steam to penetrate reasonably well and to form. The open container should be inverted over a wire basket so that air drainage will take place.

*Second*, the air must be entirely expelled from the sterilizer. This is done by allowing the air vent to remain open until steam freely flows out. Even leaving one third of the original air in the sterilizer will markedly reduce sterilizing efficiency. The type of steam pressure sterilizer which has a mercury thermometer at the air vent is to be recommended because when this thermometer registers the proper temperature, it is reasonably certain that the sterilizer is being properly operated and that sterilization is taking place.

*Third*, certain materials such as petrolatum, petrolatum gauze, and dry powders, including talcum and the sulfonamide drugs which cannot or should not be wet, cannot be sterilized within a reasonable time in a steam pressure sterilizer.

Liquids require that the pressure in the steam sterilizer be reduced gradually; otherwise they will boil vigorously and blow out the stoppers or wet the plugs. In con-

trast, sterilized dressings, gowns, and instruments can be partially dried by reducing the pressure very rapidly, thus causing the rapid evaporation of the moisture. Dressing sterilizers allow a partial vacuum to be created, which facilitates much more thorough drying. The cost of steam pressure sterilizers has prevented their use by most practitioners.

Pressure cookers are essentially small, steam pressure sterilizers. The fact that they expel the air through the top, and that air is much heavier than steam, makes them less reliable and longer periods of exposure are to be recommended. However, if the steam is allowed to escape for several minutes after it appears to have replaced the air, excellent results can be obtained. The pressure gauge also should be checked, as a majority of the pressure gauges which have been examined have been found to read too high, thus giving a false sense of security. For the sterilization of liquids, an excess of water is placed in the bottom of the cooker and the cooker allowed to cool slowly following the twenty-five to thirty minutes it is held at the sterilizing temperature. This will minimize the boiling which occurs as the pressure drops. For the sterilization of gowns, shrouds, dressings, and instruments, only the minimum amount of water is used. The materials are held well above the bottom by a rack, and the outlet petcock is opened immediately after sterilization has been accomplished. The sterile materials taken out of the cooker immediately after the pressure has dropped will be found to be almost dry. If desired, these can be placed in an ordinary electric oven set at 230 F. (110 C.) for complete drying.

Pressure pans which resemble an ordinary sauce pan, but which have a locking lid and which allow pressures of 5 to 10 lb. to be attained, will give results much superior to boiling, but inferior to pressure sterilizers. Since these pans cost only a few dollars, no veterinarian should be without one unless he has access to superior equipment.

## DRY HEAT

Baking in an ordinary kitchen oven is a convenient and reliable method of sterilizing many articles. Two electric stoves are in use in the author's laboratory. The classical directions for hot air sterilization, which call for holding at 160 C. (320 F.) for one hour, antedate the common use of reasonably accurate thermostatic controls on ovens. The primitive gas ovens then used for dry heat sterilization made overnight heating impractical and somewhat hazardous and the high temperature,

TABLE I—Time and Temperature Required for Dry Heat Sterilization

| Exposure* (Hr.) | Temperature† | | | | Bacteriological Results | |
|---|---|---|---|---|---|---|
| | Thermometer Bulb in Wrapped Bottle | | Thermometer in Wooden Case on Oven Shelf | | Wrapped Bottle | Unwrapped Bottle |
| | C. | F. | C. | F. | | |
| 8 | 115 | 239 | 118 | 244 | Gr. + gas-producing sporulating anaërobes and Gr. + pellicle-forming, sporulating aërobes | Gr. +, pellicle-forming sporulating aërobes |
| 8 | 120 | 248 | 125 | 257 | Gr. + sporulating aërobes | sterile |
| 14 | 119 | 246 | 122 | 250 | Gr. + gas-producing sporulating anaërobes | sterile |
| 22 | 120 | 248 | 124 | 255 | sterile | sterile |
| 14 | 120 | 248 | 123 | 253 | Gr. + sporulating aërobes | sterile |
| 14 | 120 | 248 | 123 | 253 | sterile | sterile |
| 14 | 122 | 252 | 127 | 261 | sterile | sterile |
| 8 | 126 | 259 | 135 | 276 | sterile | sterile |
| 14 | 126 | 259 | 135 | 276 | sterile | sterile |
| 14 | 126 | 259 | 134 | 274 | sterile | sterile |
| 14 | 128 | 262 | 145 | 293 | sterile | sterile |

*Time electricity was on. A lag of from 1-2 hours occurred before the center of the wrapped bottle came within 1 to 2 C. of the final temperature. Most of this differential continued even after forty-eight hours of continuous heating, indicating that the position in the oven as well as the insulating effect of the wrapping and the slow penetration of heat through the glass bottle were responsible.

†The thermometer in the wood case which rested directly upon the metal shelf always registered higher than the thermometer within the wrapped bottles.

short time method was recommended. Where overnight heating is used, considerably lower temperatures give satisfactory results and the degree of reliability is increased because ample time is allowed for heat penetration into dense objects and air pockets.

Where glassware is to be sterilized, thermal shock is lessened if the heating rate is decreased. In an electric stove, the top heating element is removed and the connection changed so that 110 volts instead of 220 volts reach the bottom element. If still slower heating is desired, the two sections of the element can be changed from parallel to series connection.

*Experimental.*—In order to ascertain the minimum sterilizing time and temperature in the oven of a domestic type electric stove in which the heating rate had been reduced, 8-oz., screw cap prescription bottles were contaminated by rinsing with a broth culture of thermoduric organisms which had withstood previous unsuccessful attempts at dry heat sterilization. Next, approximately 2 Gm. of each of the following materials were added: dry but reasonably fresh horse, sheep, rat, and chicken feces and contaminated tissue and debris from septic wounds. The bottles were allowed to remain open at room temperature for several days until the contents were air-dry. These bottles were tested in pairs. One bottle was covered with a wrapping paper top, which extended down about 3 inches. A 14-inch thermometer was placed through the mouth of the second bottle, and the bottle wrapped in four thicknesses of new, bleached, cotton flour sacking, small holes being pierced in the sacking to allow the stem of the thermometer to protrude. The wrapped flour sacking was tied with heavy thread and then this was wrapped in a double thickness of wrapping paper which also was tied. Thus, materials most difficult to sterilize were given more protection from heating than would be likely under conditions of surgical sterilization. Both bottles were then placed in the oven, and a second thermometer, with the mercury bulb still in the wooden case, was placed on the oven shelf with the bottles. Readings of both thermometers were recorded at the end of the period of heating, and, in most trials, several times during the sterilization. After the oven was turned off, the bottles were allowed to cool for one to two hours and then each received 100 cc. of Brewer's anaërobic medium which had been freshly prepared and cooled to 45 C. The bottles were incubated aërobically at 37.5 C. for seven days before being discarded as negative. Anaërobic growth was recognized by turbidity and sometimes gas in the medium and aërobic growth by growth near the surface or by pellicle formation. From bottles showing growth, cultures of heat resistant organisms were obtained for the contamination of future test bottles.

As is shown by the data presented in table 1, baking overnight at 261 F. (127 C.) was sufficient to sterilize under the adverse conditions used in the test. Teat tubes which had been immersed in contaminated milk, allowed to dry, and then placed in corked or screw cap vials were slightly easier to sterilize.

These data are somewhat similar to those obtained by other investigators. Murray and Headlee[9] found that the spores of three strains of *Cl. tetani* required from twenty to forty minutes exposure to dry heat at 125 C. to kill. This was reduced to less than fifteen minutes when the temperature was 140 C. Koch and his coworkers reported that three hours of exposure to 140 C. was necessary to kill the spores of *B. anthracis*.

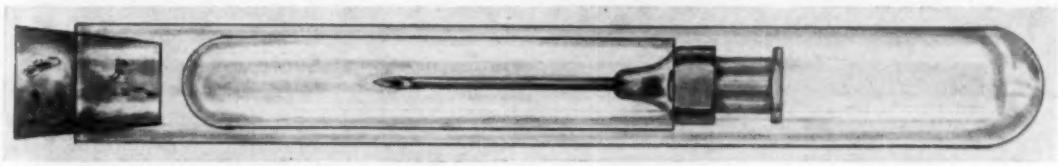

Fig. 2—Over night, in an ordinary kitchen oven at 130 C. (266 F.), or above, gives a sterile needle which can be kept sterile under adverse conditions. The small tube which does not admit the shoulder of the needle protects the point and allows the sterile needle to be placed on the syringe without being touched. The use of a separate, sterile needle for each animal is a refinement which many owners appreciate.

In veterinary practice, overnight baking at 285 to 290 F. (140 to 143 C.) affords a reasonable margin of safety where the degree of contamination is not excessive and where the materials are properly wrapped and placed in the oven.

This temperature does not draw the temper of cutting instruments. Materials placed in the oven at the end of the working day are sterile the following morning. Where considerable sterilization is done, it

is worth while to have an automatic time switch, which is set to turn the oven off at 4 a.m., thus allowing the materials to be cool enough to handle when work is started in the morning. Because the thermostat on a household stove may not be accurate, it should be checked occasionally by placing a thermometer in the materials being sterilized. A thermometer resting directly on a metal shelf usually gives a fictitiously high reading. The prolonged period of exposure allows adequate time for the dry heat to penetrate, and even scalpels, teat tubes, and syringes packed in sealed vials or jars are sterilized.

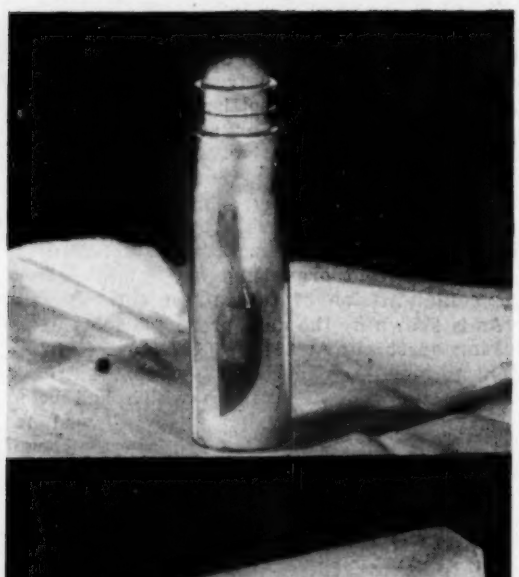

Fig. 3—Preparation of Bard-Parker scalpel blade for dry heat sterilization and sterile storage.

Suture needles are sewed into cloth, which is folded and wrapped to afford protection when they are removed. The barrel and plunger of the all glass type syringes can either be placed side by side on a cloth and wrapped and tied, or they can be placed in stoppered vials which protect them after they are removed for storage. Low expansion glass now is being used for some syringes which can be heat sterilized while assembled.

Talcum requires prolonged heating while glycerin is readily sterilized. Petrolatum and petrolatum gauze offer a slight hazard of boiling over, causing a fire hazard. This is especially true when they are contaminated by water. Some of the sulfonamide drugs are not sterile when purchased and must be carefully heated before they are introduced intraperitoneally or into deep wounds. They are not injured by 145 C. overnight, the melting point of sulfanilamide being 165 C., sulfapyridine 190 C., and sulfathiazole 200 C.

Glassware can best be sterilized overnight at 145 to 150 C. Heating slowly to this temperature and allowing gradual cooling in the oven before removal has no deleterious effect upon glass. Removing hot glassware from the oven subjects it to thermal contraction strains which cause immediate fracture or stresses which result in later breakage.

Operating gowns and shrouds should be baked only where steam sterilization is not available. The cheaper grades of cotton cloth, such as bleached flour sacking, are not discolored by overnight baking sufficient to kill bacteria, although slightly higher temperatures cause scorching. This provides a rough but reasonably reliable indicator of adequate, overnight exposure to heat.

Clean gowns and shrouds appear to be rendered reasonably safe by overnight baking at temperatures of 118 to 122 C. (244 to 252 F.) which appear to have little deleterious effect upon cotton gowns and which should have less effect upon linen. In one series of tests, linen gowns were baked overnight at 127 C. (261 F.). Two small bags containing a mixture of dust, earth, and horse manure were placed in the center of each gown, and in the morning one bag was transferred to a flask of Brewer's anaërobic medium and the other to tryptose phosphate broth. In ten trials, all cultures were sterile. Considering the gross contamination, it appears reasonable to assume that such baking should afford ample preparation for a gown which was clean when placed in the oven. Other tests

have shown that a gown which has been freshly returned from a modern laundry presents less hazard of introducing infection than many other factors which receive little attention.

Flaming instruments by passing them through either a gas or an alcohol flame is not a reliable method of disinfection. If the instrument is passed through rapidly, the thicker portions are not heated sufficiently to sterilize the surface, and only the thin and readily heated cutting edge is heated enough to kill organisms and to injure the temper of the metal. If the exposure to heat is more prolonged, the instrument is ruined.

Dipping in alcohol and allowing the alcohol to burn off is spectacular but is not efficient as a means of disinfection. Fluid alcohol cannot support combustion, and only the vapor burns. In evaporating, the alcohol absorbs its heat of vaporization, and this effectively refrigerates the surface from which the alcohol evaporates. By using a little care, alcohol can be burned from a match without heating it sufficiently to cause it to ignite.

Heating in oil was widely recommended at one time. Oil is dry and the time and temperature is comparable to that required for hot air sterilization, although the hot oil does have the advantage of rapidly conveying the heat. Hot oil baths usually are held at 300 F. or 150 C. They are messy, usually give off an unpleasant odor, and are a fire hazard.

### CHEMICAL STERILIZATION

The use of cold sterilizing solutions for instruments is not as reliable as is steam under pressure or hot air. There is reason to doubt, whether, in actual use, they are as effective as boiling. Spaulding[3] contaminated knife blades with blood or pus and *Staphylococcus aureus, Streptococcus hemolyticus, Cl. tetani,* and *Clostridium welchii.* These blades were subjected to various chemical sterilizers, including phenol-alcohol, 70 per cent ethyl alcohol, 5 per cent cresol, 5 per cent solution of borax in 10 per cent formalin, 1:2,500 metaphen, Bard-Parker formaldehyde germicide, and 1:1,000 zephiran. All killed the hemolytic streptococci in five minutes or less and *Sta. aureus* in ten minutes or less. The zephiran and the Bard Parker germicide killed *Cl. welchii* in from one to eight hours, all of the others requiring eighteen hours or longer. None of the germicides tested killed the spores of *Cl. tetani* in less than eighteen hours.

Nevertheless, chemical sterilizing solution are being widely used in veterinary and human medicine and in dentistry. Success depends upon the instrument not having been too badly contaminated with sporulating organisms, and upon the instrument being allowed to remain in the solution long enough for the chemical to exert its germicidal action. Since most of the chemicals used in these sterilizing solutions have a high temperature coefficient, solutions maintained at 100 to 110 F. would be much more reliable and rapid in action than the same solutions at room temperature. This could be accomplished by placing a very small (5 watt) immersion

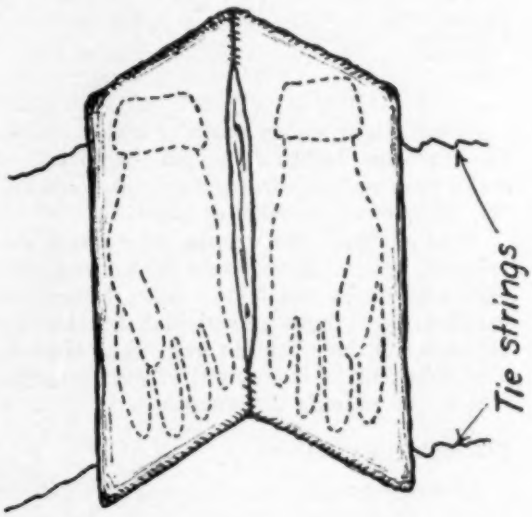


Fig. 4—A good type of glove envelope which allows the steam sterilization of the better type of rubber gloves. Be certain that the envelope is of ample size, 11½ in. by 5 in. being the minimum recommended. The openings of the pocket should be closed for 1½ in. at each end to avoid contamination in handling.

Surgical gloves used in septic operations should be discarded or thoroughly wet in a 3 per cent lye solution where they are allowed to soak over night. They should be rinsed and subjected to heat sterilization.

Gloves not subjected to septic contamination should be washed, immersed in a 1:1,000 roccal solution and placed in envelopes for steaming or steam pressure sterilization.

heater in the solution or by placing the container over a very small electric light.

### CATIONIC DETERGENTS

Zephiran and the less refined and more economical roccal are used for chemical sterilization. The following formula has given reasonably satisfactory results:

*Formula*

| | To Make 1 qt. | To Make 1 gal. |
|---|---|---|
| Roccal 10% ..... | 10 cc. | 1.25 fluid oz. |
| Potassium or sodium nitrite ..... | 5 Gm. | 5.00 dr. |
| Distilled water .....1,000 cc. | | 1 gal. |

Phemerol, or its concentrate which is sold as hyamine 1622, also can be used to make reasonably satisfactory and economical instrument sterilizing solutions.

New cationic detergents are being developed, and it is probable that many will find a place in medicine. All cationic detergents are more germicidal in slightly alkaline solutions than in neutral or slightly acid solutions. All are neutralized by soaps, which are anionic detergents.

### CRESOLIC COMPOUNDS

Liquor cresolis saponatus, lysol, or similar saponified cresols in 5 per cent aqueous solutions make reasonably satisfactory solutions for the chemical sterilization of instruments, although many veterinarians object to the strong odors of these solutions. The tendency to corrode can be checked by adding a few crystals of potassium nitrite. A transparent solution which is widely used has the following formula:

*Formula*

| | To Make 1 qt. | To Make 1 gal. |
|---|---|---|
| Amphyl ..... | 20 cc. | 2.50 fluid oz. |
| Ethyl alcohol 95% or denatured N23A... | 100 cc. | 13.00 fluid oz. |
| Glycerin ..... | 55 cc. | 6.50 fluid oz. |
| Water to make.....1,000 cc. | | 1 gal. |

### MERCURIALS

The complex salts of mercury commonly are used as instrument sterilizers, with moderate success. In these compounds, the mercury is so firmly bound that it does not tend to form combinations with the metal of the instrument as would be the case if mercuric chloride were used. During recent years, bacteriologists have become aware of the tremendous bacteriostatic activity of these complex mercurials, as compared with their bactericidal powers, and recognize the extreme difficulty in evaluating them. Bacteria coated with one of these substances may fail to grow in subculture, yet these same organisms may grow and produce infections when placed in tissues.

Mercury oxycyanide, $H_2(CN)_2.HgO$ contains 85.5 per cent mercury and the 1:6,000 dilution in water is slightly alkaline, pH 9.1. Many hospitals use a 1:1,000 dilution as a soak for catheters, filiforms, and other equipment which would be damaged by heat sterilization. Solutions are only slightly corrosive to metals.

Merthiolate is the sodium salt of ethyl mercury thiosalicylic acid. It contains approximately 49 per cent mercury and the 1:1,000 dilution is alkaline, pH 9.8. Brewer[4] reported the failure of 1:1,000 dilutions to kill the spores of *Cl. tetani, Cl. septicum* or *B. anthracis.*

Metaphen, $C_7H_5O_4HgN$, is used as its sodium salt, usually in dilutions of 1:2,500 which are quite alkaline, pH 10.5. When conditions favorable to bacteriostatic action are present, very small amounts of metaphen inhibit the growth of many organisms. However, in the experiments reported by Brewer,[4] exposure for twenty-four hours to 1:2,500 metaphen failed to kill the sporulating anaërobes.

Merphenyl nitrate, which also is called phenyl mercuric nitrate, is $C_6H_5HgNO_3 \cdot C_6H_5HgOH$ and contains about 63 per cent mercury. Brewer[4] found the 1:1,500 dilution, which usually is recommended, to have little effect upon the spores of *Cl. tetani.*

### FORMALIN AND ALCOHOLS

Formalin is widely used by clinicians as a germicide, although bacteriologists have known for years that dilute solutions of formaldehyde tend to place microörganisms in a condition of suspended animation, or bacteriostasis, rather than killing them. When carried into a wound, there always is the possibility that such organisms will recover and cause infection. Stronger solutions kill. The temperature coefficent of formalin is rather high, so that cold solutions are much less reliable. The following formulae are in fairly common use.

*Borax-Formalin Formula*

| | To Make 1 qt. | To Make 1 gal. |
|---|---|---|
| Formalin (38% formaldehyde) | 100 cc. | 13 fluid oz. |
| Borax (sodium tetraborate) | 50 Gm. | 6.50 fluid oz. |
| Water to make | 1,000 cc. | 1 gal. |

*Alcohol-Formalin Formula*

| | To Make 1 qt. | To Make 1 gal. |
|---|---|---|
| Formalin (38% formaldehyde) | 130 cc. | 1 pt. |
| Potassium nitrite | 0.15 Gm. | 8 gr. |
| Sodium hydroxide (household lye) | 0.012 gr. | 0.6 gr. |
| Ethyl alcohol (95%) to make | 1,000 cc. | 1 gal. |

Ethyl alcohol also has been widely used as a germicide. Usually, ethyl alcohol is purchased as 95 per cent pure. There have been reports that exactly 70 per cent by weight of alcohol is far more effective than either more dilute or more concentrated solutions. In an instrument sterilizing solution, it is difficult to maintain an exact concentration of alcohol, because instruments may be slightly moist from previous washing when placed in the bath, and because the alcohol will tend to evaporate more rapidly than the water. Ethyl alcohol is the most feeble germicide being used for instrument sterilization. Only when the instruments have been protected from previous contamination and have been properly cleaned prior to immersion, can ethyl alcohol yield satisfactory results.

Isopropyl alcohol has approximately twice the germ-killing power of ethyl alcohol. It is readily obtainable without internal revenue restrictions and is nontoxic when applied externally. There appears to be no critical concentration which must be maintained in order to obtain bactericidal efficiency. If alcohol is chosen as the sterilizing agent for instruments, isopropyl alcohol can well replace ethyl alcohol.[5]

## HOT SOLUTIONS OF CHEMICAL DISINFECTANTS

For the practitioner who does not have access to a steam pressure sterilizer, hot solutions of disinfectants are indicated for the sterilization of instruments contaminated by septic operations.

Most germicides have a marked temperature coefficient[6] and are much more active as germicides at high temperatures. When heated to 160 F. (71 C.) or above, lysol, amphyl, and liquor cresolis saponatus become very active germicides. At this temperature even 1 per cent solutions are capable of giving positive disinfection of reasonably clean instruments within a few minutes. Where steam pressure sterilization is not available, boiling in 2 per cent solutions should be the method of choice in disinfecting instruments contaminated by septic operations or where infection with sporulating clostridia is a hazard. Alkalies should never be mixed with these disinfectants, as the resulting chemical combinations are practically without germicidal activity.

## FUMIGATION

Fumigation, usually with formaldehyde vapors, is an obsolete method of disinfecting instruments, although chambers for such sterilization still are offered for sale by some hospital supply houses. For formaldehyde gas to be effective as a germicide, four conditions must be met:

*a*) A reasonably high concentration.
*b*) A long period of exposure.
*c*) High relative humidity of the atmosphere.
*d*) Reasonably high temperature.

Instruments maintained for any length of time in a cabinet, where the atmosphere is nearly saturated with moisture, will rust and deteriorate more rapidly than if subjected to a short period of brisk boiling in a trisodium-phosphate solution and then kept in dry storage.

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[4]Brewer, J. H.: The Antibacterial Effects of the Organic Mercurial Compounds. J. Am. Med. A., *112*, (1939): 2009.
[5]McCulloch, Ernest C.: Disinfection and Sterilization. Lea and Febiger, Philadelphia, 1945.
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Dicumarol, active principle of spoiled sweet clover hay, has been found to possess germicidal as well as anticoagulant properties.

## Ethylene-Oxygen Anesthesia

Although ethylene-oxygen anesthesia has been extensively employed in human surgery since 1923 and has eliminated some of the more objectionable properties of ether, chloroform, and other inhaled anesthetics, its use in veterinary surgery is yet to be started, advantageous as it may prove to be in the small animal clinic.

Following its use on 106 patients at the Presbyterian Hospital of Chicago, in 1923, considerable fuss was made by the newspapers over explosions which had occurred during its administration. On that account, its use was rejected by some hospitals for the time being. In 1940, however, the Mayo Clinic reported 61,824 and the Sayre Clinic 35,500 administrations, showing that its popularity continued to mount regardless of the allegedly excessive flammability which time was to prove does not exceed that of other explosive inhalants, preventive measures being equal, such as avoiding the use of actual cautery and sparking devices, preventing the flammable gas from impregnating the ambient air, and maintaining a humidity of 60 per cent or more in the operating room.

Chemically, ethylene is an unsaturated hydrocarbon—a dehydrated ethyl alcohol—$C_2H_5OH$ plus heated $H_3PO_4$ equals $C_2H_4$ plus $H_2O$. Instead of orthophosphoric acid, the decomposing agent might be sulfuric acid, or ethylene may be prepared by cracking propane. The commercial product currently provided contains as much as 99.90 per cent of pure ethylene by volume. The U.S.P. requirement is 99 per cent. The refined product is a colorless, nonirritant gas of pleasant, musty odor when deprived of impurities: hydrogen sulfide, carbon dioxide, aldehydes *et al.*

The induction is rapid, pleasant, and practically devoid of an exciting stage. It does not increase mucous secretions or irritate the pulmonary epithelium or cause the critical spasms of ether and chloroform. The period of recovery is short because ethylene does not enter into combination with hemoglobin. Within two minutes after administration is discontinued, no trace of it can be detected in the blood. Muscular relaxation is, however, only moderate—in fact, not adequate for some intra-abdominal surgery, but this objection is offset by its rapid and pleasant induction and recovery and the safety element in the second plane of a surgical anesthesia, including visible signs of warning against over-dosing: anoxia, acute asphyxia declared by ocular phenomena.

In dogs, ethylene-oxygen produces but little alteration of the blood-sugar percentage and less change in coagulation and bleeding time than ether, chloroform, nitrous oxide-oxygen, and spinal anesthesia. Death is due to arrest of respiration. If the heart action is normal, the animal recovers promptly with artificial respiration. That is to say, the effect on cardiac automaticity is minimal. There is little or no toxic effect on the renal parenchyma, and the urine remains quantitatively and qualitatively normal.

Morphine or barbiturate premedication or other types are employed. Atropine is not indicated because it produces neither mucous membrane irritation nor cardiovagus activity. Ethylene-oxygen is the preferable inhalation for the "poor risk" subject.—*H. M. Livingston, M. D., Department of Surgery, University of Chicago, The Present Status of Ethylene-Oxygen Anesthesia., Ann. Surg. 122, (Dec. 1945) 1071-1085.*

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## Ramon's Tetanus Treatment (Human)

The new method of treating tetanus developed by Dr. G. Ramon, of the Pasteur Institute of Paris, along with his work on anatoxins (tetanus and diphtheria) which has been widely discussed in Continental medical and veterinary literature, consists of massive doses of tetanus antitoxin reinforced by a series of toxoid injections. Under chloroform anesthesia of ten minutes' duration, 70,000 units of antitoxin are given intramuscularly and 70,000 subcutaneously, followed immediately with 2 cc. of tetanus toxoid. The dosage is followed with 2 cc. of toxoid two days later, 4 cc. after another four days, and 6 cc. on the eighth day after the first treatment.

An alternative is to administer the second 70,000 units intravenously drop by drop diluted in 500 cc. of isotonic saline solution. The total antitoxin dose can be raised to 160,000 units arbitrarily. In a communication to *Société Nationale de Médecine*, Dr. P. E. Duroux (*Méd. et Hyg.*, Dec. 15, 1945) reports 2 cases of human tetanus cured by the method.

# CLINICAL DATA

## Some Highlights from State Meetings

**Forty-ninth Annual Meeting, Minnesota State Veterinary Medical Society, Jan. 28-30, 1946.**

Liver is the "heavy industry" factory of the body. Its weight is measured by pounds or kilos, not in ounces or grams, as are most organs and glands. The liver may increase in size by 50 per cent following a meal. Carbon tetrachloride may produce a detectable fatty degeneration of the liver in as short a time as six hours.—*J. L. Bollman, M.D.*

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There are two kinds of hypersensitivity which are important in animals: *allergy*, which occurs naturally, and *anaphylaxis*, which may be produced in experimental animals. There are 15 diseases in which allergy is important.—*F. W. Wittich, M.D.*

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Dogs must be prepared for distemper vaccination as pigs are prepared for cholera vaccination.—*Dr. J. M. Krichel.*

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Minnesota has 380 veterinarians in practice, and 70 per cent of these are members of the state society.—*Dr. H. C. H. Kernkamp.*

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In milk and dairy inspection, the Veterinary Corps of the U. S. Army has blazed a trail for the private practitioner to follow.—*Capt. J. H. Steele.*

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A problem facing Minnesota is: How can veterinarians who reside in states where there are no veterinary colleges get their sons enrolled in a veterinary college and get them back home to take up the practice?—*Dr. C. F. Schlotthauer.*

• • •

**Thirty-first Annual Meeting, Wisconsin Veterinary Medical Association, Jan. 30-31 and Feb. 1, 1946.**

Acute cases of mastitis should be treated. To save the life of a cow is important, even though she does not milk afterward.—*Dr. D. E. Jasper.*

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Most pigs can be immunized with serum and virus, even when they are nursing immune sows. On some of these, we use 30 cc. of clear concentrated serum and 6 cc. of virus. They are revaccinated if kept as breeders.—*Dr. L. P. Doyle.*

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The nutrition of the sow is an important factor in the size of the litter, the livability of the young, and the rate of growth.—*Dr. R. B. Hippenbecker.*

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Public licensure of a veterinarian is based on the premise that he will render a complete veterinary service.—*Dr. A. H. Quin.*

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The veterinarian should not try to outmerchandise the druggist, but he should stock a variety of drugs and be prepared to use, to dispense, and to merchandise some drugs. Those which are for sale should be displayed where they can be seen.—*Dr. E. W. Krueger.*

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The veterinarian must have a sense of responsibility and a realization of obligation to his community as well as to his client.—*Dr. Sam Elmer.*

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Trichomoniasis, which is erratic in virulence and for which there is no effective control, is a practitioner's problem.—*Dr. W. Wisnicky.*

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The favorable time to examine females for trichomoniasis is about ten days after service of a previously clean animal, or about two days before the expected onset of heat, when infection has been of long standing.—*Dr. J. T. Schwab.*

# Preliminary Tests with DDT for Single-Treatment Eradication of the Swine Louse, Haematopinus Suis

H. E. KEMPER, D.V.M., and I. H. ROBERTS, B.S., D.V.M.
*Albuquerque, New Mexico*

IN THE SOUTHWEST, as elsewhere, the swine louse, *Haematopinus suis*, is a troublesome parasite the year around. Applications of crankcase oil, fuel oil, creosote emulsions, or rotenone-containing powders as dips or sprays, have afforded varying degrees of control of hog lice on farms and ranches. These materials, however, destroy motile lice only. They require two, three, or more applications correctly spaced, as in the case of creosote or rotenone, or repeated application of oils to destroy the young lice hatching from eggs on the hair. For obvious reasons, louse eradication following customary treatment is not often effected, and despite considerable vigilance on the part of alert hog raisers the swine louse usually persists.

This paper describes a preliminary series of experiments in which DDT in oil-and-water emulsions was employed as a "lousicide." The final test of the series shows that a single application of DDT eradicated *H. suis* effectively from a large herd of very heavily infested hogs.

## MATERIALS AND METHODS

Only exceedingly heavily infested Berkshire and Duroc swine, with infestations of long standing, were used in the following experiments. The work was undertaken on a cooperative basis with local stockmen, and carried out under typical farm conditions. For this reason, it was impossible to maintain control animals on the premises, since isolation of experimental animals could not otherwise be guaranteed. In the first two tests, a large, hand-powered barrel pump was used; the pump was capable of delivering in excess of 50 lb. of pressure at the nozzle. For the third test, a 425-gal. dipping vat of superior design was available. The isolation of all swine after treatment was assured until the termination of each test.

The DDT emulsions used were essentially similar throughout, except that a commercial emulsifiable petroleum oil[1] was included in the two initial tests. The soap[2] was a high-grade, granulated, laundry soap, of a type and quali readily available to all farmers and hous holders. Insecticidal emulsions were prepare as follows:

*Test No. 1*

| | |
|---|---|
| DDT | 0.1% |
| Benzol (technical) | 0.3% |
| Kerosene (refined) | 1.0% |
| Emulsifiable petroleum oil | 1.0% |
| Granulated laundry soap | 0.25% |
| Water—q.s. | 100.00% |

The DDT was disolved in the benzol, an the kerosene and emulsifiable oil were adde to the solution. This stock solution was take to the farm. At the hog pens, the soap was di solved in hot water (125 F.) equal to appro imately three times the volume of the stoc solution. The stock solution was added to th soap solution and the mixture was shaken vi orously. Cold water to make up the desire total quantity was added with continued ag tation.

*Test No. 2*

| | |
|---|---|
| DDT | 0.5% |
| Benzol (technical) | 1.5% |
| Kerosene (refined) | 1.0% |
| Emulsifiable petroleum oil | 1.0% |
| Water—q.s. | 100.00% |

The DDT was dissolved in benzol, and ker sene and emulsifiable oil were added to the s lution. This stock solution was added to thre times its volume of hot water (125 F.) an agitated with a paddle. Cold water to make th desired total volume was then added. Consta agitation during use was required to keep thi emulsion from separating into oil and wate fractions.

*Test No. 3*

| | |
|---|---|
| DDT | 0.75% |
| Benzol (technical) | 1.58% |
| Kerosene (refined) | 3.00% |
| Soap | 0.21% |
| Water—q.s. | 100.00% |

The DDT was dissolved in benzol; kerosen was then added to the solution. At the dippin vat, half the quantity of soap to be used wa

From the Zoölogical Division, Bureau of Animal Industry, Agricultural Research Administration, U. S. Department of Agriculture.

[1]Continental Oil Company—soluble oil.

[2]Lever Brothers, Cambridge, Mass.—Rinso.

dissolved in hot water (125 F.) equal in volume to that of the stock solution. The soap water was placed in the reservoir of a power-driven, orchard sprayer, with rotary agitator in motion. With the spray directed into the reservoir, the DDT stock solution was added. The remaining half of the soap was next dissolved in the cold water in the dipping vat, and the DDT-benzol-kerosene-soap-water emulsion forced into the dipping vat under high pressure through a spray nozzle. An excellent creamy, stable emulsion resulted; there was no separation of the oil-water fractions or settling out of DDT at any time during the day.

## RESULTS

*Test No. 1 (0.1% DDT).*—A 265-lb. sow and her 7, 40-lb. pigs, all heavily infested with lice and nits, were sprayed liberally with a total of 15 gal. of a 0.1 per cent DDT emulsion. Pen and shed were cleaned as well as possible, but circumstances did not permit removal of the pigs to clean ground. Within four hours after treatment all lice were dead. Reëxamination twenty days later showed a great many viable lice on the sow and pigs.

*Test No. 2 (0.5% DDT).*—A 275-lb. sow and her litter of 7, 60-lb. pigs, all very lousy and heavily covered with nits, were sprayed with a large volume of 0.5 per cent DDT emulsion. After treatment, all animals were removed to a clean, newly constructed pen. Within four hours after spraying no live lice were found. Examination on the second and fourth week after spraying disclosed no live lice on any of the pigs; the sow was not available for examination. On the eighth week after treatment, 2 viable adult lice were found on 1 of the pigs, and 1 on another.

*Test No. 3 (0.75% DDT).*—A very lousy herd of 300 swine of all ages was dipped in a vat having a capacity of 425 gal. Each animal was forced below the swim surface several times, and held sufficiently long to insure thorough wetting. After the dipping procedure, the vat contents were emptied into an orchard sprayer, and the 0.75 per cent DDT emulsion sprayed about the farrowing houses, sheds, and pens.

Within four hours after dipping no live lice were found on a representative number of animals selected at random. At this time, hairs to which nits were cemented were shaved from several animals and removed for subsequent laboratory observation. In clean Petri dishes maintained at 70 F., hatching of live lice from the nits began the day after collection, and continued for eighteen days.

Examinations of the dipped sows, shoats, and pigs were made on the 8th, 19th, 35th, 49th, 69th, 105th, and 123rd days after treatment. At no time was a single, viable, young or old louse found.

## DISCUSSION

Oils were used in the DDT formulation to facilitate emulsification and to assure adhesion of the DDT-benzol solution to skin and hair. It was apparent that the heavy petroleum oil used in tests 1 and 2 offered no advantage over a light oil, such as kerosene.

It is generally conceded that passage through the dipping vat is the most satisfactory means of assuring ectoparasite eradication. High pressure sprays were undeniably effective, and had certain advantages over the vat. The operator, however, could not assure the complete exposure to parasiticidal action of the entire surface of every animal in a herd. For this reason, direct comparison between the preparations used in tests 1 and 2 (spray) and test 3 (dip) could not be made on the basis of available data. It is not improbable that emulsions containing less than 0.75 per cent of DDT, applied as dip, may prove efficacious in eradicating hog lice following a single dipping. Although further work in this direction is in progress, the evidence already available shows that the preparations used were in no way injurious to swine.

## SUMMARY

Three groups of swine, all heavily infested with *Haematopinus suis* and maintained under average farm conditions, were treated once only with DDT in mineral oil-and-water emulsions. Sprays containing 0.1 per cent and 0.5 per cent DDT, each tested on 1 sow and 7 litter-mate pigs, destroyed all motile lice within four hours after application, but did not destroy all young lice hatching from eggs thereafter. However, only 3 lice were found eight weeks after treatment with the 0.5 per cent DDT spray. A dip containing 0.75 per cent of DDT, tested on 300 heavily infested pigs, not only killed all motile lice within four hours, but continued to destroy newly hatched lice thereafter, and effectively eradicated *Hae-*

*matopinus suis* from the herd. The nits were not killed by the DDT emulsions used. Young lice continued to hatch, and death occurred following contact with the hairs and skin of treated animals.

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## Tetanus in an Elephant

Examination of an Indian elephant at the New York Zoölogical Park, in 1941, revealed the following: jaws tightly closed, temperature 98.6 F., hypersensitiveness to sound, prolapsing of the nictitating membranes, and erection of the tail (poker tail) when the animal was touched or excited. A diagnosis of tetanus was made and 50,000 units of tetanus antitoxin were given subcutaneously on each side of the neck.

The next day the animal had relaxed somewhat, drank water that was pumped into the mouth with a stomach tube, but could not eat. In view of the improvement no antitoxin was administered.

On the third day the animal was down and in tetanic spasms. Two ounces of chloral hydrate (7% solution) were administered per rectum, and a deep sleep began in twenty minutes, lasting two hours. During this sleep, 120,000 units of tetanus antitoxin were administered, and because spasms began when the sleep wore off, 4 ounces of chloral hydrate were administered per rectum.

On the fourth day, the animal was raised with slings and a hoist, and was able to stand and move about slowly. The mouth could be opened to about one third its normal size, and bread was rolled into small balls and placed on the tongue. With difficulty these were swallowed until about three loaves had been eaten. In the afternoon this was repeated, and a bran mash consisting of 6 quarts of bran in a bucket of water was pumped onto the tongue and swallowed.

From the fifth to the tenth day there was no change, the animal was fed as indicated, plus 2 pounds of sugar and 3 dozen bananas daily; 1 additional injection of 80,000 units of antitoxin was administered. After this period, the animal was hand fed for sixteen days and kept in slings for ten more because of weakness. It finally began to eat and made a complete recovery.

(This case report which originally appeared in *Zoölogica, 27,* (1942) : 5, was sent to us by Dr. L. J. Goss after we had erroneously published a report of rabies in an elephant under a title of tetanus.—Ed.)

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## Sensational Treatment of Equine Colic

Novocaine, intravenously, in doses of 0.04 to 0.20 Gm. per 100 kg. of body weight is reported to have given remarkably quick relief to horses stricken with colic. Interesting results were obtained from 0.10 to 0.12 Gm. per 100 kg. Although the m.l.d. was not definitely determined, horses about to be slaughtered supported 0.40 Gm. per 100 kg. The doses were dissolved in saline solution or boiled water, and were injected slowly—one minute.

Since novocaine is destroyed in the blood in fifteen or twenty minutes, there was but to resort to other treatment if the pain was not stopped in half an hour.

While the pharmacodynamics described are admitted to be theoretical, the drug seems to be endowed with an inhibitory action against the intestinal spasms which generate colic. The treatment need not be expected to abolish intestinal obstruction nor overcome overwhelming secondary disorder. It is rather adapted to the early stage in horses subject to repeated attacks. The pain was promptly and permanently checked and there was no objectionable stimulation and subsequent retardation of peristalsis such as is produced by eserine, arecoline, acetylcholine, and lobeline nor the dilating action of atropine.

Novocaine was found to accelerate the cardiac rhythm, reinforce the myocardium, and diminish respiratory frequency. The treatment was most effective when the gas from arrested alimentary material was blocked against the obstacle to intestinal transit.—*A. Brion: The Treatment of Equine Colic with Intravenous Injections of Novocaine. Bull. Acad. Vét. de France, 18, (Nov. 1945): 264-288. Title translated.*

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It has been said that *Salmonella suipestifer* infection of hogs is but a secondary phase of nicotinic acid deficiency. This is by no means universally conceded, although it must be admitted that many cases of such infection respond favorably to the use of niacin.

# Strychnine Poisoning

T. LLOYD JONES, B. V.Sc., M.Sc., C. S. I. (c)
*Edmonton, Alberta*

STRYCHNINE is a common cause of poisoning among livestock. It is the principal ingredient of most of the vermin-killers found around farm buildings, and is probably the most common agent for poisoning with criminal intent. Accidental poisoning sometimes occurs in dogs and cats.

An interesting experience with poisoning of livestock by strychnine was brought to my attention by an officer of the Royal Canadian Mounted Police. With only the history as a guide, he presented a dead pig at our diagnostic laboratory. An autopsy revealed no lesions of disease but putrefaction had not advanced normally during the forty-eight hours that the pig had been dead. The provincial analyst found 0.25 gr. of strychnine in stomach contents weighing 2 lb. 5 oz. The hog feed was also examined and 2.2 gr. of strychnine were found in the contents of a quart jar. Four oz. of stomach contents from another pig showed 0.05 gr. of strychnine.

The officer in charge of the local police detachment received a telephone call from the plaintiff, saying that her livestock had been poisoned and she demanded an investigation. Certain details of this investigation are of human interest.

The plaintiff had been away from her farm between 3:30 and 5:30 on the afternoon of the previous day. At 6 p.m. she soaked 1 1/2 gal. of a mixture of oats and barley chop in 5 gal. of water. This was mixed with 3 gal. of slop feed left over from the same morning. She fed approximately 1 gal. of equal parts of this grain slop and milk to 8 pigs, 2 months old. A dog licked this feed and was soon showing symptoms of strychnine poisoning. She then fed 4 gal. of the same feed to 22 pigs, 3 months of age that were housed separately. Attracted by squealing noises, she returned to the first group of pigs and found that 3 had died. The others were "wobbling around, rolling on the floor and stretching hard. All were dead within ten minutes." Returning to the group of 22 pigs, she found them all dead "in less than ten minutes." Meanwhile, the dog had crawled under the house where it was found dead. Emphasizing the great susceptibility of this species to strychnine, another dog that was seen to lick the first one on the mouth was later found dead. A third dog died with similar symptoms ten days after the others.

On the following evening a cow died after showing agonal symptoms all day. She had eaten about 1 1/2 qts. of hog feed on the previous day.

The plaintiff lost 30 pigs, 3 dogs, and 1 cow. Assuming that an average sample of feed was analyzed, the amount of strychnine in the 8 1/2 gal. of mixed feed was in the order of 93 gr. This may have been added in the form of strychnine crystals or gopher poison. In the latter, regulations under the Pest Control Products Act (1927) require 3 per cent strychnine. If liquid gopher poison had been used, approximately half a 13-oz. can diluted with the hog feed would give the proportionate amount of strychnine found in aliquots.

It is of interest to record that the police did not apprehend the perpetrator of this crime. A neighbor was suspected by the plaintiff and was accused on evidence that a cast made from a footprint near the premises was identical with an unusual tread on rubber boots found in the neighbor's house. Incriminating statements made by the accused were also significant. These included (prior to offense): "Someone got a couple of my hogs and I'm going to get even" and (after the offense) "The police can't catch the offender because no one saw him do it." In his defense, this man admitted that the footprint could have been his but claimed it had no incriminating significance because he made frequent friendly visits to the plaintiff's premises.

Parenthetically, I ought to add the local rumor that the plaintiff had been stealing food from a neighbor who had put strychnine in grain that was likely to be stolen to teach her a lesson, by producing the results recorded here. The criminal record of the plaintiff makes this a specious story;

From the Veterinary Laboratory, Department of Agriculture, Edmonton, Alberta, Canada.

the last heard of her was in a news item that she had been given a two-months' jail sentence for stealing turkeys.

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## Treatment of Stiff Lambs with Wheat Germ Oil

In 1944 and 1945, Willman and associates[1, 2] at Cornell University, reported the prevention and cure of stiff-lamb disease by the use of vitamin E concentrates. During the lambing season of 1945, the stiff-lamb disease (white muscle disease, muscular dystrophy) developed in lambs of the flock of sheep maintained by the Montana Veterinary Research Laboratory. Nineteen lambs out of 134 born developed definite symptoms of the disease. The symptoms appeared when the lambs were very young, the age ranging from five to twelve days. Six of the cases were very acute, 3 of the lambs dying in less than twenty-four hours from the time symptoms first appeared.

Treatment with a vitamin E concentrate was tried, based on the Cornell work. The only form of vitamin E concentrate immediately available was a wheat germ oil, which was advertised to contain 3.5 mg. of tocopherol per gram. The dose used was 10 cc. which weighs 9 Gm. and, therefore, should contain 29.5 mg. of tocopherol. The oil was administered after emulsifying it in 50 cc. of milk. From 1 to 3 doses were given at intervals of one to five days. The treatment was apparently very effective. Of 13 cases of varied severity which were treated with wheat germ oil, 2 acute cases were fatal, while 11 of the treated lambs recovered. The 2 fatal cases were very acute, death occurring within a few hours of the time symptoms first appeared, so that there was no opportunity for results from the treatment.

As a control of the effect of the treatment, 6 affected lambs were left untreated, with only 2 recoveries. Paired comparisons were made between the lambs of each of three pairs developing symptoms of about the same severity within the same 24-hour period. In all these comparisons, the treated lambs recovered. Two of the untreated lambs died, while the third became helpless and would have died if there had been no interference. In this case, after the lamb became unable to stand, treatment with wheat germ oil was started, and the lamb eventually recovered.

There seemed to be no doubt that the treatment with wheat germ oil was very effective, where it was started soon after symptoms first appeared and, in 1 case, treatment was followed by recovery when it was started six days after the initial symptoms appeared. In 6 recovery cases, only 1 treatment with 10 cc. of wheat germ oil was used. In this series of cases, the lambs were very young, symptoms appearing between the ages of 5 and 12 days, which may have been a favorable condition as compared with treating older lambs. —*Hadleigh Marsh, D.V.M., Bozeman, Montana.*

[1]Willman, J. P., Loosli, J. K., Asdell, S. A., Morrison, F. B., Olafson, Peter, and Hopper, H. D.: the Prevention of Losses from the So-Called Stiff-Lamb Disease. J. Anim. Sci., 3, (1944): 453.

[2]Willman, J. P., Loosli, J. K., Asdell, S. A., Morrison, F. B., and Olafson, Peter: Prevention and Cure of Muscular Stiffness in Lambs. J. Anim. Sci., 4, (1945): 128-130.

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## Functionating Minerals

Researches by Rubay and Bertrand on the fate of calcium gluconate in normal cows and cows affected with milk fever (*Ann. de Méd Vét. 83,* (March 1938) : 97) indicated that while a part of this ionisable calcium salt is rapidly excreted by the kidneys and intestines, the major portion is actually immobilized in the soft tissues and proceeds to correct the responsible factor—tissular calcium deficiency of which hypocalcemia is but a reflection. In other words, calcium gluconate satisfies an existing calcium hunger.

Whatever may be the biological problem, normal or pathological, there are mineral elements playing important rôles—in particular, sodium, phosphorus, calcium, sulfur, along with minor minerals participating. While biological processes are thought of in terms of complex organic material, their dependence upon the specific fundamental actions of mineral matter tends to remain under-estimated in attempts to explain the manifestations of life (*Biol. Méd. 27,* (July, 1937) : 427) since function in the living being is a closed contract between mineral and organic matter.—*Condensed from abstracts in Rev. de Path. Comp., 45,* (July-Aug. 1946).

# A Transmissible Gastroenteritis in Pigs

L. P. DOYLE, M.S., D.V.M., Ph.D., and L. M. HUTCHINGS, D.V.M., M.S.
*Lafayette, Indiana*

DURING several years, we have observed sporadic outbreaks of a disease characterized clinically by diarrhea, vomiting in some cases, rapid loss of weight, and a high death rate in baby pigs. Death losses have been limited largely to pigs only a few days old. However, older hogs observed have been affected. Some shoats and brood sows on farms where the disease occurred showed diarrhea and sometimes vomited. The diarrhea was often quite profuse in older hogs, sometimes accompanied by considerable loss of weight. Vomiting was observed more frequently in brood sows than in shoats. Recovery was prompt in older animals and the death loss was usually very small. The disease in brood sows was not observed by us except when baby pigs were also affected. What appeared to be the same disease was observed affecting nearly entire herds of shoats when there were no baby pigs on the farm. Cases also have been seen where the disease apparently spread from baby pigs and brood sows to shoats on the same farm.

A good many cases have been seen where the disease failed to recur on affected farms, even where sows whose litters had been affected were rebred and produced more litters within the year. In a fewer number of instances, the disease has recurred in successive litters. It has been observed in fall litters as well as in those farrowed in the spring.

The most evident pathologic features, when present, were gastritis and enteritis; however, gross evidence of inflammation of the stomach and intestine was not always found. The mesenteric blood vessels were usually markedly engorged. The kidneys usually showed degenerative changes and often contained urates. Frequently, the stomach and intestine were filled with milk in cases showing severe gastroenteritis as well as in cases where gross inflammatory changes were not observed. The most nearly constant finding was a large amount of highly fluid intestinal content having a whitish, yellowish, or greenish color. Hyperemia and hemorrhage in the stomach and intestine were mainly in the mucosa but easily seen from the serous side. The affected organs were sometimes a deep red.

Thus far, microscopic examination has not revealed much tissue change in addition to what could be seen on gross examination. The intestinal epithelium usually showed evidence of increased mucus secretion. The degenerative changes in the kidneys appeared to be mainly albuminous. In some mesenteric lymph glands, what appeared to be foci of beginning degenerative changes have been seen.

This disease may be highly fatal to newborn pigs, particularly if large numbers are kept in a small space, as in a central hog house. An instance was observed where there were 390 pigs farrowed in a central hog house and only 90 survived. Most of the deaths occurred when the pigs were between the ages of 2 days and 1 week. The majority of 38 brood sows on this farm became sick and 2 died, but apparently not from this disease alone, since both sows showed marked fibrosis of the kidneys. Some animals in a herd of shoats on this farm also became affected. All affected shoats recovered.

## EXPERIMENTAL

Since field observations indicated that there is probably a specific disease causing serious gastroenteritis in baby pigs and a usually nonfatal affection of older swine, it was decided to attempt to reproduce the disease experimentally. It was found that the disease developed promptly in baby pigs following exposure, either by putting a naturally affected animal in with healthy ones or by putting portions of the gastrointestinal tract and content from affected pigs in the mouths of healthy pigs.

The contagiousness of the disease was indicated by the following experiment: A naturally affected pig from a herd where approximately one half of the baby pigs had died was placed in a pen with a sow and a litter of 8, 1-day-old pigs. At the

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end of twenty-four hours the originally affected pig was dead and at least 2 of the contact pigs had diarrhea. At the end of forty-eight hours, most of the pigs in the contact litter were sick. The pigs scoured and some of them vomited. They were also gaunt and had apparently undergone considerable dehydration. During the third day, 3 of the pigs died; the sow vomited, developed profuse diarrhea, went off feed, and appeared somewhat depressed. By the end of the fifth day, all of the pigs were dead. The sow was apparently well on the fifth day after she first showed symptoms. The lesions found in most of the pigs on postmortem examination were gastritis, very marked in some animals, marked injection of the mesenteric blood vessels, and more or less enteritis in many cases.

Transmission of the disease by material from the gastrointestinal tract of affected pigs is illustrated by the following experiment: A sow and her litter of 10, 2-day-old pigs were put in a clean pen. Small amounts of triturated gastrointestinal tract were placed in the mouths of 3 of the pigs. The pigs thus exposed were put back with the sow and remainder of the litter.

At the end of twenty-four hours, 1 of the exposed pigs was vomiting and had white scours. Another exposed pig appeared weakened and may have had diarrhea. The third exposed pig appeared well. At the end of forty hours, practically all of the pigs appeared sick, they were scouring and some vomited. The sow vomited at the end of about forty hours. She soon developed a profuse diarrhea, went off feed, became gaunt and somewhat weak. At the end of the fourth day after the experiment was started, the sow was apparently normal except that she was gaunt and milk secretion had decreased or stopped entirely. All of the 10 pigs were dead by the end of the sixth day following exposure.

Six other litters, comprising 48 pigs, from 1 to 3 days of age were used in experiments similar to the one described above. These litters were kept separate and 2 or 3 pigs in each litter were exposed by placing in their mouths triturated gastrointestinal tract from affected pigs. All of the directly exposed pigs became affected, some at the end of eighteen hours after exposure. The contact pigs later became affected and approximately 95 per cent of them died within six days. Three of the 6 sows became affected, but recovered within a few days.

The results of experiments with filtrates indicated that the causative agent passed through filters which retain ordinary bacteria. Filtrates were prepared from triturated gastrointestinal tracts of affected pigs, tested for sterility in broth and on tryptose-agar plates. All filtrates used were bacteria-free as indicated by these tests.

Five litters of pigs were used in the experiments with filtrates. Approximately 0.5 cc. of filtrate was placed in the mouth of each pig. All of the litters except 1 developed symptoms following the feeding of filtrate. The symptoms were much the same as those following the feeding of unfiltered material, except that they were less marked in some cases, and the incubation period was longer in some instances. However, 1 litter showed vomiting and scours, as early as eighteen hours after it was fed filtrate. The death loss was approximately 50 per cent here, as compared with about 95 per cent in pigs exposed to unfiltered material. Stomach and intestinal lesions were less constant and in some cases less marked than those found in pigs fed unfiltered material. The 1 litter which failed to show symptoms following the feeding of filtrate was 11 days old when fed. Another litter, 1-day old, which was fed a portion of the same filtrate developed well-marked symptoms by the end of twenty-four hours.

The causative factor may remain active for several weeks when stored frozen. Gastrointestinal tract which had been stored for seventy days in the freezing compartment of an electric refrigerator was tested on a litter of 2-day-old pigs. There were 10 pigs in the litter; 3 of them were exposed by placing some of the gastrointestinal tract in their mouths. At the end of twenty-four hours, some of the exposed pigs were sick. On the third day, the sow and all of the pigs were sick. The pigs vomited and scoured. All of the pigs but 3 were dead on the fourth day. These 3 remaining pigs were killed while very weak. The sow recovered. Postmortem examination of the pigs showed marked gastroenteritis.

Since hog cholera is an important cause of gastroenteritis, it was thought advisable to determine if the cholera virus played a part in this disease of pigs. Blood was col-

lected from 6 affected pigs. The blood was defibrinated, pooled, and injected into an unvaccinated shoat weighing about 100 lb. The shoat did not show any effect of the blood injection. Three weeks later, it was injected with hog-cholera virus and then developed fatal hog cholera. Anti-hog cholera serum failed to give any appreciable protection against gastroenteritis when used on the 4 litters of baby pigs. The serum was injected in the axillae at the time the pigs were exposed by mouth.

An effort was made to transmit the disease to 1 calf. A 1-day-old calf was exposed by placing in its mouth some triturated stomach and intestine from an affected pig. The calf was kept under observation for four weeks without showing symptoms. Another portion of the material used in exposing the calf was used on 2 litters of pigs. The pigs promptly developed the disease.

Penicillin and sulfathalidine were tried on portions of 2 litters comprising 17 pigs. Treatments were begun at the time the pigs were exposed. One treatment was given the first day, 3 the second and 1 each on the third and fourth days. The dose of sulfathalidine was 0.5 Gm. by mouth while the dose of penicillin was 10,000 units given intramuscularly. Six of the 17 pigs were treated with sulfathalidine, 6 with penicillin and 5 served as controls. Five of the 6 treated with penicillin and 4 of the 6 treated with sulfathalidine died or were killed while moribund. Two of the 5 controls died.

## DISCUSSION

The selection of a suitable name for the disease here reported presents the usual difficulties. It probably has been called scours in the past. Scours is not a satisfactory name because it does not distinguish between the different causes of diarrhea.

Gastroenteritis is not entirely satisfactory because grossly recognizable inflammation of the gastrointestinal tract is not always apparent. To call it three-day pig disease appears inadvisable because this name has already been applied to what is probably a different disease. The name gastroenteritis has been used here because it is descriptive of the chief clinical and pathologic features commonly observed. The disease can doubtless be named more appropriately after the nature of the causative factor has been determined.

## SUMMARY

A sporadic disease having clinical and pathologic features of gastroenteritis has been observed to cause heavy death losses in baby pigs in affected herds.

It affects older swine, but less severely than baby pigs.

The disease developed promptly in baby pigs following pen exposure, and also following *per os* administration of triturated gastrointestinal tract and content from affected pigs.

*Per os* administration of filtrate of triturated gastrointestinal tract was followed by gastroenteritis in baby pigs. One effort to transmit the disease to a young calf failed.

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While the value of DDT in the treatment of body infestation with lice (*pediculosis corporis*) surpasses that of former drugs used for the purpose, it is not equally effective against head lice *pediculosis capitis*), according to Molner (*Am. J. Pub. Health, 35*, (Dec. 1945) : 1302-1303). Better results were obtained from a 20 per cent solution of the proprietary drug, Phenyl Cellosolve in ethyl alcohol, which has value equivalent to benzyl benzoate 25 per cent in water, the popular treatment for scabies. Some controlled work remains to be done on the insecticide properties of these wartime drugs in animals.

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Ever since antibiotic agents were put to practical use, scientists who "missed the boat" have been combing the records for the first exponents of the principle involved. Says one: Metchnikoff in 1897 noted the microbicide power of *Bacillus subtilis*, Maurice Nicole in 1907 demonstrated that *B. subtilis* rendered soluble the pneumococcus, and the bacilli of glanders and anthrax, and in 1911, Levaditti showed that filtrate of that bacterium had remarkable trypanocide action *in vitro*, signifying that a scientific observation not put to work does not make the headlines.

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We deserve liberty only so long as we are willing to sacrifice something for it.—*Benjamin Franklin.*

# Recent Studies on the Treatment of Infectious Sinusitis in Turkeys

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MADSEN,[1] and Dickinson and Hinshaw[2] have described methods of treatment of the swollen sinuses of turkeys suffering from infectious sinusitis. The method of treatment by these authors consisted of aspirating the mucus by means of a syringe followed by immediate injection of the drugs into the sinus. Dickinson and Hinshaw obtained from 74 to 87 per cent recovery by a single treatment with 4 per cent silver nitrate and 52 to 86 per cent with 15 per cent argyrol. Madsen reported 80 to 90 per cent cures with 4 per cent silver nitrate and comparatively unsatisfactory results with argyrol, metaphen, glycerin-iodine (tincture), and calomel. The present paper reports further trials with silver nitrate and argyrol, as well as two other colloidal silver preparations (protargol and novoxil), and two ephedrine preparations containing sulfonamides*. The technique employed was essentially the same as that used by Dickinson and Hinshaw except that a larger syringe was used for the drugs in order to conserve time. One cc. of drug was used in all treatments except rhinazine, when 2 cc. were given.

TABLE I—Comparative Efficiencies of Six Drugs in Treatment of Infectious Sinusitis in Turkeys

| Drug | Concentration per cent | Number of poults treated | Number cured with one treatment | Percentage efficiency | Remarks |
|---|---|---|---|---|---|
| Silver nitrate | 4 | 120 | 100 | 83.3 | Freshly prepared |
| Silver nitrate | 4 | 46 | 33 | 71.7 | Two weeks old |
| Silver nitrate | 4 | 277 | 251 | 90.6 | Freshly prepared |
| Silver nitrate | 4 | 212 | 187 | 88.2 | Freshly prepared |
| Protargol | 5 | 21 | 15 | 71.4 | |
| Protargol | 5 | 63 | 30 | 47.6 | |
| Protargol | 5 | 144 | 53 | 36.8 | Improperly prepared |
| Protargol | 7 | 64 | 43 | 67.2 | |
| Protargol (Winthrop) | 7 | 64 | 50 | 78.2 | |
| Argyrol | 15 | 39 | 23 | 59.0 | |
| Novoxil (Squibb) | 7 | 29 | 15 | 51.7 | Severe swelling after treatment |
| Ephedrine 2 sulfanilamide 5-carboxythiazole | .. | 18 | 6 | 33.3 | |
| Rhinazine (ephedrine sulfadiazine and sulfathiazole) (Lederle) | Sulfa drugs 0.2 | 137 | 18 | 12.2 | |

The trials were all made on one ranch during 1945. On February 7 and 15, 2,019 poults (group 1) were put in one brooder house of ten rooms. One week later, 2,100 poults (group 2) were put in houses 30 feet away. On March 11, 1 bird was heard coughing in group 1, and on March 19 the first swollen sinus was noted in this group. By March 27, 14 cases were found and on April 5, 52 cases. There were only 1,543 birds at that time due to an early loss from salmonellosis; so there was an incidence of 3.3 per cent. On April 20, there were 93 cases (6.1 per cent) in 1,520 birds. By May 25, there had been 664 new cases or an incidence of 42 per cent. Final records showed that at least 945 (59.1 per cent) of the 1,600 birds present when the first

From the Department of Veterinary Science, University of California.

*These two preparations were furnished by courtesy of Lederle Laboratories, Pearl River, New York.

case was noted developed sinusitis by August 14. Very few cases developed after that time.

In group 2, there were no indications of the disease until May 5, nearly two months after it appeared in group 1. It finally spread throughout this group, but the incidence was never as great as in group 1. For example, one lot of 500 poults segregated from group 2 showed no swollen sinuses until July 6, and by July 9 had only developed 9 cases.

The first treatments were done when the birds were still in the brooder house (9 weeks old); the last were on July 24. After that time, the number of new cases was insignificant. A total of 1,234 turkeys were treated during the season. Four trials (655 birds) with 4 per cent silver nitrate gave efficiencies of 71.7 to 90.6 per cent (table 1). It may be of significance that the group giving an efficiency of 71.7 per cent was treated with a solution at least 2 weeks old. The two trials giving greatest efficiency (88.2 and 90.6 per cent) were conducted with a solution made on the day of treatment.

Protargol (Winthrop) is a colloidal silver preparation containing 8.3 per cent silver. It has certain advantages in that it stains less than argyrol and of course much less than silver nitrate. It has certain disadvantages of preparation in that it should be sprinkled over a large surface of water and allowed time to settle; it should not be stirred. In the case of its lowest efficiency (36.8), it was erroneously made up in a narrow-neck bottle with insufficient surface. On other trials, it gave efficiencies of 47.6 per cent, 67.2 per cent, 71.4 per cent, and 78.2 per cent (356 cases treated). It compares favorably to argyrol in its effectiveness.

Argyrol was used in one trial only and gave an efficiency of 59.0 per cent. As stated above, Dickinson and Hinshaw obtained from 52 to 86 per cent efficiency with this drug.

Novoxil (Squibb) is a colloidal silver oxide plus cupric oxide preparation to be dissolved in mineral oil. It was used in a 10 per cent freshly prepared mineral oil suspension and injected in 1-cc. amounts. It caused very severe swellings of the tissues and gave an efficiency of only 51.7 per cent in the one trial made.

The two ephedrine sulfonamide preparations did not cause severe reactions, but apparently were not retained in the sinuses long enough to be of any benefit. The percentages of recovery were only 33.3 and 12.2.

### DISCUSSION AND SUMMARY

It was hoped that some drug less caustic in its action than 4 per cent silver nitrate, but still efficient as a cure for infectious sinusitis, might be found. None of the ones tested proved equal to it. Protargol (7 per cent) showed some promise. Of all the remedies tested to date, those containing silver are best retained in the sinus, and 4 per cent silver nitrate, in freshly prepared aqueous solutions as used in these trials, proved superior to other preparations.

#### References

[1]Madsen, D. E.: Sinusitis of Turkeys and Its Treatment. Utah Agric. Exper. Sta. Bull. 280 (1938): 1-12.

[2]Dickinson, E. M., and Hinshaw, W. R.: Treatment of Infectious Sinusitis of Turkeys with Argyrol and Silver Nitrate. J.A.V.M.A., 93, (1938): 151-157.

## Cyanogenic Forage

In addition to the poisonous plants to which livestock is exposed, every annual crop of edible forage brings a quota of hydrocyanic (prussic) acid poisonings. In both poisonous and edible plants, HCN is widely distributed either bound within their glucosides—the sugar-containing active principle decomposed by enzymes or mineral acids—or else present as free ions at variable concentrations in variable parts of the plant and at variable stages of growth. The typical mechanism of forage poisonings from glucosides is best illustrated in the fermentation of amygdalin, the active principle of bitter almond: $C_{20}H_{27}NO_{11}$ (amygdalin) plus $2H_2O$ (water) equals $2C_6H_{12}O_6$ (glucose) plus $C_6H_5CHO$ (oil of bitter almond) plus HCN (hydrocyanic acid). The poisoning of livestock with cyanogenic plants follows that general pattern but such plants stand apart from those normally containing toxic concentrations of the free ion.

Amygdalin is present in fruits (peaches, plums, apples *et al.*), the toxic property of which was known before its chemistry. A comparable glucoside of peculiar concern in veterinary medicine is linamarin, the glucoside of flaxseed, and of other seeds, which decomposes into glucose, acetone, and hydrocyanic acid.

The leaves of certain shrubs and trees (wild cherry, laurel cherry, vetch) contain toxic amounts of HCN. Livestock toxicologists list over 80 plants of the Graminacae family, among them millet, sorghum, and maize, which are capable of injuring stock, when consumed in liberal amounts at certain stages of growth. Flaxseed becomes toxic only in the form of linseed cake wetted with warm water and permitted to ferment before feeding. Such poisonings are, therefore, exceptional.

All-in-all, succulent feeds are the most likely to produce trouble, whether the HCN is free or combined. In dry feeds, there is no meeting of enzyme and glucoside to form hydrocyanic acid outside of the body, but when masticated, moistened, and churned in the warmth of the rumen or stomach, toxic amounts may be liberated.

While the consumption of hydrocyanic acid by livestock sometimes appears to exceed the m.l.d., the intake is gradual and elimination keeps pace with absorption so that it is only under rare combinations of circumstances that toxic concentrations ensue. HCN is not accumulative, not even momentarily. The m.l.d. of 20 gr. in cattle, for example, could be harmless unless quickly absorbed as 1 dose. In the case of linseed cake which normally assays from 0.05 to 3.5 gr. per pound it would require quite a quantity to precipitate symptoms of hydrocyanic acid poisoning under customary feeding practices. One should, therefore, hesitate before pronouncing a given forage mortally cyanogenic, as much as one should be cautious about exposures to manifestly toxic leaves like those of growing sorghum or a fallen wild cherry tree. These are examples of consuming free hydrocyanic acid in large doses that are rapidly absorbed.

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## Theories on the Etiology of Cancer

Except for the quite general agreement that cancer is a constitutional, not a local, disease, its cause remains among the serious unknown problems of medical science. The cardinal theories under the constant investigation of research pathologists are: (1) heredity, (2) chronic local irritation, (3) infection, and (4) chemical. To these one might add: occupational, cicatricial, and experimental, although these might be blended with the others. The theory of chronic local irritation of Virchow is the oldest and the chemical theory is the most recent. It is said that the old Virchow theory continues to have the most exponents. Infection, first documented by Rous in 1910 (sarcoma of Rous), by Shope in 1933, by Beard and Wycoff in 1937, and by Verge and Drieux in 1942, has been advanced audaciously as the cancerigenic agent on the ground of having produced certain cancers in birds and laboratory rodents experimentally. The experimental cancers produced in mice and rabbits, the occupational cancers of workers with coal tar oils and dyes, and the remarkable hereditary demonstration of Miss Maude Slye (in thousands), along with the unproved theories mentioned above leave the cancer problem complex and unsolved.

The first actual cancerigenic substance was isolated from coal tar by Cook (England) in 1933. Credit, however, goes to Yamagiwa and Itchikwa (Japan) who, in 1915, were first to produce cancer in rodents with oil of tar. Summarizing the knowledge on the etiology of cancer, and particularly the chemical theory, Vuillaume (*Réc. Méd. Vét. 121*, (Sept. 1945): 257-279) concludes that the origin of cancer is a *mutation of genes* which provokes from a sound cell a cancerous cell that engenders the malignant tumor in the presence of two factors: (1) a state of predisposition and (2) the presence of a cancerigenic substance. The predisposition resides in a combination of physico-chemical and metabolic variations encountered in all the individuals of a species or only in certain individuals of the same species. The predisposition may be hereditary or acquired and the cancerigenic substance may be of external origin (metabolic, bacterial, virus). After a period of variable duration the cancerigenic substance attacks the point of cancerous cell mutation and in that place a cancer develops. The presumption of this (chemical) theory is that the amount of cancerigenic substance is too tiny to be detected by any known method of research, which is confined by the infinitesimal amount of coal tar material required to produce an experimental cancer; and most certainly the long chain of breeding experiments of Miss Slye in mice does not permit the hereditary theory to be dismissed.

## Reports a Successful Treatment of Azoturia

After proposing *toxic myoglobinemia* as the rational name for what is *azoturia* in English veterinary literature and *hemoglobinuria* in the Latin countries, and describing a pathology that is quite generally acceptable to the modern student of that baffling disease, Dr. Yves Pincemin (*Bull. Acad. Vét. de France, 18,* (Jan. 1945) : 18-32), describes a new type of therapy and a number of observations on cases of different degrees of severity (unilateral, bilateral, apoplectic) in which results reported were astonishing.

The treatment consists of a depletive jugular phlebotomy of 12 liters (for large horses) followed by a 2-liter intravenous injection of oxygen and symptomatic treatment, for which pilocarpine and oil of camphor are the drugs of choice. Stimulating or depressing alkaloids (caffeine, morphine) are forbidden. A copious drench of bicarbonate of sodium is also recommended to aid in coping with the ever present acidosis (lactic acid) poured into the circulation from the stricken muscles, along with other metabolic débris. The basis of the treatment, however, is the bleeding to remove as much toxic material from the blood as feasible, plus the antacid action of oxygen gas. Using an oxygen generator, the gas is delivered slowly (2 cc. per second) to prevent mortal gaseous embolism.

If the patient is seized with dyspnoea which may seem alarming, delivery is slowed up to 0.5 cc. per second but not stopped until the 2 liters have been injected, which requires about ten minutes. It is not unusual for a horse with a unilateral case to walk off normally as if cured as soon as the operation is terminated. In horses where the condition lasts five to six days, 4 or 5 daily injections may be required. In fact, the oxygen injections are continued until the glycemia is normal. After each treatment the blood glucose values drop,—for example from 270 cgm. per liter to 89 in one observation.

For the recumbent animal, the legs are securely tied and the head stretched and immobilized to control objectionable movements. The treatment should be given as soon as possible to prevent aggravation of the muscular lesion.

The pathology of azoturia has been somewhat, if not entirely, clarified in recent years. The intoxication supposedly originates in the large cecum of the heavily fed horse accustomed to daily exercise to maintain digestive equilibrium and the load (of toxin), quickly sapped up by the accelerated circulation, precipitates a muscular debacle, causing terrific engorgement, grave toxemia, and neuropathic paralysis. The paralysis is explainable as a veritable "sectioning" of nerve trunks by pressure of the hardened muscles. The paralysis is strictly crural, temporary or lasting—*temporary* in the horse that recovers normal locomotion when the acute stage ends and *chronic* when the femoral nerve has been sufficiently damaged to cause crural atrophy of considerable duration—six months or more. Nothing appears to remain unproved in the pathology of azoturia except the theory of cecal origin which is based on various plausibilities.

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## Equine Periodic Ophthalmia and Weil's Disease: A Theory

In a comprehensive article with an extensive bibliography on irido-cyclitis of man in which the disease is compared with periodic ophthalmia of the soliped, Dr. Guy Offert (*Rev. de Path. Comp. et Hyg. Gen. 45,* (1945) : 275-279) proposes leptospirosis among the etiological theories for the reason that Weil's disease of the human being and periodic ophthalmia of the horse have comparable manifestations of irido-cyclitis and uveitis and that horses are susceptible to spirochete infections. Also both are somewhat related to environmental humidity. Quoting: "Without expecting to find here the cause of equine irido-cyclitis, it seems reasonable to suggest this as an etiological hypothesis to be envisaged. At least, one cannot dismiss the subject without pointing out the two leptospiroses of man which have comparable ocular complications."

[While the darkish dank barns with ground floors, common in rural districts of the central and eastern states, have been repeatedly mentioned as contributing causes of periodic ophthalmia, the theory is not borne out in other observations. The opposite was found to be true—as of the basement stables of Chicago which were common during the heyday of the draft

horse; Chicago veterinarians have frequently emphasized that the course of periodic ophthalmia was arrested when horses became residents of that city and that primary attacks were exceptional, notwithstanding the high atmospheric humidity.—ED.]

## Types of Tubercle Bacilli in Animals

In a report to the Academy of Medicine (France), Professor Jean Verge of the Alfort faculty makes some startling revelations on the types of *Mycobacterium tuberculosis* and relative occurrences in horses, cattle, hogs, dogs, and cats, noting that the rôle played by the human type in animals has not been critically investigated. The findings are both paradoxical and new, according to the published report (*Rev. Path. Comp. et Hyg. Gen. 45*, (Sept.-Oct. 1945): 313-316). A remarkable disclosure of the author's personal research is that the human type was responsible for 100 per cent of the canine cases; the bovine type was found in 100 per cent of the feline cases, duly typed according to standard laboratory methods. Out of 16 hogs, 12 were of the bovine type and 4 atypical. In 3 horses, 1 was the human type and 2 the bovine type; in 37 chickens all were avian.

The author tabulates the findings of others as follows:

| Species | Number | Human type | Bovine type | Atypical | Avian Type |
|---|---|---|---|---|---|
| Horse | 112 | 11 | 90 | 1 | 10 |
| Sheep | 270 | 1 | 269 | .. | .. |
| Goat | 54 | 1 | 52 | .. | 1 |
| Hog | 3,416 | 98 | 1,196 | 63 | 2,001 |
| Dog | 606 | 392 | 200 | 14 | 12 |
| Cat | 132 | 6 | 126 | .. | .. |

The high incidence of human tuberculosis in dogs is explainable by close human association and eating habits. Cadiot and Deuville mention the frequence of tuberculosis in restaurant and cafe dogs through voluntarily lapping sputum from the floor. Canine tuberculosis is often "open": lung cavities, bronchiectasis, intestinal ulcers and cutaneous. The tuberculous dog, in view of these facts, is a peril, especially to children, of whom they are precious companions. They spread infected material over exterior mediums and should be subjected to severe prophylactic measures, that is, sacrificed.

## Clinical Notes

Rotenone-DDT spraying promises to replace the dipping of cattle for the removal of ticks.

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The extensive use of penicillin has revealed the occasional presence of an allergy manifested by pruritus following its use.

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Hexadienol, a commercial diene-alcohol, is recommended as a substitute for pilocarpine and other parasympathetic stimulants.

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The blood pressure of 6 normal dogs, determined by puncture of the femoral arteries, ranged from 112 to 142 and averaged 132.

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Since animal pathology touches almost every human problem in every walk of life, there is really no "foreign material" in a journal of veterinary medicine.

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Obviously, magnesium sulfate is not the drug of choice for euthanasia in horses. Ambruse (*Indian Vet. J.* (Nov. 1945): 210) found that 4 pints of a saturated solution, intravenously, was not fatal to a pony.

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The vitamin B synthesized in the rumen of cattle and recoverable in the feces accounts in part for the thrift of hogs that "follow the steers".

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There are still numerous centers of contagious bovine pleuropneumonia to guard against the spreading of that disease into the noninfected cattle-raising countries. *Borrelomyces peripneumoniae* is not a respecter of climates where cattle flourish.

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While the passive, nonspecific transmitters of microbial diseases include a long list of arthropod pests, the known specific carriers of specific microbial infections can be counted on the fingers of one hand: *mosquitoes* (yellow fever, malaria), *ticks* (Rocky Mountain spotted fever), *flies* (sleeping sickness, kala-azar), *lice* (typhus), *fleas* (bubonic plague).

# NUTRITION

## Lameness in Swine

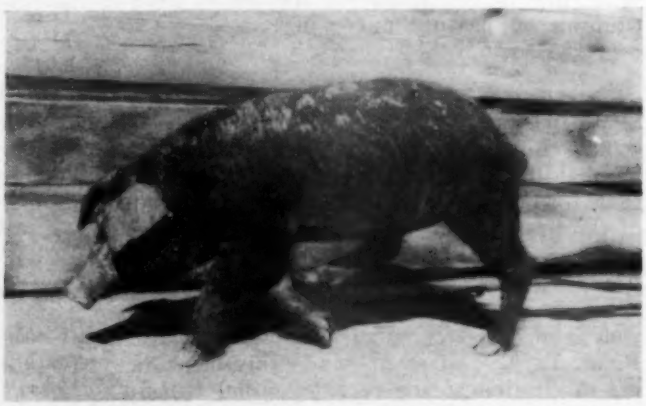
DEFICIENCIES in growing pigs are often manifested by lameness or stiffness. In many instances, the early symptoms are not observed, so that the owner considers the lameness as the first symptom to appear. He is therefore prone to call it rheumatism or paralysis. Early manifestations of malnutrition include arrested growth, a reduced intake of feed, a lustreless coat of dry hair, and a general appearance of unthrift.

*—From Nutrition News Bulletin*

**A pig suffering from rickets.**

Complete nutrition in the young pig begins with proper feeding of the pregnant sow. The item most likely to be low in farm rations is a protein supplement, preferably of animal origin. Such a protein probably will furnish calcium and phosphorus in favorable proportions and in suitable amounts, as well as a variety of amino acids from which animal protein can be produced. By feeding young pigs on rations compounded from purified chemical substances certain requirements have been found to be essential. In addition to those mentioned, there are a number of vitamin factors known to be needed to support normal growth and development. Two fat soluble vitamins, A and D, are recognized in this group, along with at least five water soluble vitamins—thiamin, riboflavin, niacin, pantothenic acid, and pyridoxine. This listing does not imply that any or all of the other known vitamins are unnecessary, but only that the pig has been able to live and grow without supplying them directly. Many of them will be synthesized in ample amounts by the body from other substances.

The most common form of lameness in growing pigs is borderline rickets, and this is especially true during the winter months. Pigs so affected need sunshine and they need alfalfa hay. In rickets, the stiffness or lameness is followed by enlarged joints,



**A goose-stepping pig, a result of pantothenic acid deficiency.**

*—From Nutrition News Bulletin*

arched back, and refusal to move about. If the case is already well established when first seen, it may be advisable to correct the deficiency by adding irradiated yeast to the ration; but, as already indicated, alfalfa hay will prevent rickets and it will also correct many of the early stages.

A slight stiffness may be an indication of vitamin A deficiency. If so, there also will be poor appetite, an unthrifty appearance, and a characteristic restlessness and excitability. The advanced stages of this condition are manifested by a swaying of the rear quarters, and twitching of the muscles when lying down. Some affected animals develop severe spasms or convulsions, and in some there is impaired vision. Alfalfa hay supplies ample amounts of vitamin A, or of its precursor, carotene, to prevent deficiency; and any other green roughage or pasture would be reasonably effective. Fish oils may be used in the ration, but they are more expensive than pasture or leafy alfalfa hay.

Motor disturbances of several kinds occur with a lack of vitamins of the B complex. The most prominent of these is a goose-stepping gait seen when pantothenic acid is lacking. Another is a bowing of the front legs, along with an abnormal standing position which brings the rear legs well up under the body. Both of these may be encountered under farm feeding conditions, and both can be corrected by adding alfalfa hay to the ration.

For all practical purposes, then, the lameness in growing pigs, if of a nutritional nature, can be prevented or corrected by adding leafy alfalfa hay or alfalfa meal to the ration at the rate of 10 to 12 per cent of the feed. The lameness due to nutritional deficiency is not likely to appear in pigs running on pasture or eating hay.

## Hatchability Depends on Feeding

The nutritive requirements for good hatchability are greater and more exacting than for egg production, and good nutrition of the breeding flock is a factor in the performance of chicks hatched from such a flock. In other words, good egg production is no guarantee that the eggs will hatch well and produce vigorous chicks. Dr. R. M. Bethke, of Ohio, made this clear in his discussion at the recent Annual Nutrition Conference.

## Nutritional Deficiencies of Farm Animals

Mineral deficiences may be important when farm animals are fed roughage which has been grown on depleted soils. Phosphorus deficiency is most extensive, Dr. C. F. Huffman told members of the Ohio Annual Nutrition Conference, Nov. 1-2, 1945, especially when the ration consists primarily of roughage. Grains and milling by-products help to correct the lack; root crops are lower than hay and silage in this element. Calcium is not likely to be deficient because most farm roughages contain ample amounts. Cobalt, iodine, and manganese may be deficient in certain areas. While copper and iron are important in blood formation, a deficiency of these is much more common in baby pigs than in other classes of farm animals.

## Health of Nation Linked with Animal Nutrition

We have long been concerned with eggs —when production is low or when the eggs don't hatch — but little has been done to learn how they can be improved as food. The science of animal nutrition has contributed much to the health of the nation, remarked Prof. C. M. Ferguson of The Ohio State University, recently, but much has been achieved as an incidental issue instead of being the primary consideration in planning experiments.

## Food Value Expressed as Electrical Energy

The average person consumes enough food to have an energy equivalent of 3.5 K.W.H. daily, while the dairy cow consumes enough feed to generate 46.5 K.W.H. each day—when she can get it. She actually uses as much energy as a 5-horsepower dynamo running a full ten hours a day, according to a man who should know his energy values, James W. Pope, director of TVA.

Vitamin $B_c$, an antianemia factor was isolated from yeast by Pfiffer (*Science, 102*, (1945) : 228). The antianemic property was assayed by the chick anemia method.

## Animal Protein for Poultry

Methionine may at times be the limiting factor in poultry nutrition, especially when very little animal protein is present in the ration. Prof. R. V. Boucher, Pennsylvania State College, finds this to be true in experimental work, and adds that vitamin D from irradiated animal sterol is about twice as effective as that from cod liver oil in promoting calcification in poultry.

## Animal Nutrition and Human Health

Speaking about energy that comes from food and feed is simply another way of talking about nutrition — human and animal. Animal ailments are on the increase, and many of the animals culled because of decreased reproduction, debilitating disease, body malformation, and other irregularities are used for human food. James W. Pope, director of TVA, in calling attention to this situation asks: "What effect does, or will, the use of this meat have on human health?"

## Variations in Hay and Silage

The feeding value of hay is determined by a number of factors, says C. F. Monroe, of Ohio, and lists the following: fertility of soil where grown, kind and mixture of plants, stage of maturity when cut, method of curing, kind and amount of handling, time and condition of storage, amount of rainfall while curing, and amount of heat during storage.

The feeding value of corn silage is also subject to wide variations, and depends upon: variety, fertility of soil where grown, stage of maturity when cut, proportion of ears to fodder, and the success of preservation.

## Calf Meals

There is little to be gained by feeding calf meals, Prof. V. E. Scott, extension dairy man in Nevada, tells his farmers, because the base for calf meals is skimmilk, and the processing only adds cost to the original product without improving it. He suggests the feeding of ground grain, cracked corn, or whole oats as a more economical procedure.

## Supplementary Vitamins for Calves

Until the calf is consuming at least a pound of sun-cured hay and a pound of fortified calf starter per day, some need exists for supplementary feeding of vitamins A and D, especially during the milk-feeding period in winter.—*Dr. W. E. Krauss, Ohio Annual Nutrition Conference, Nov. 1-2, 1945.*

## Vitamin D for Dogs

Work at Cornell University Medical College demonstrates conclusively that there is a difference in the vitamin D requirements of male and female puppies. Six litter mates, 3 male and 3 female, were maintained on the same ration. All 3 males developed marked rickets, while only 1 female showed a slight sign of such disturbance.

Disease prevention is primarily correct management.

Pigs farrowed on pasture make better gains because pasture furnishes more of the needed food elements and less exposure to disease and parasites.

One of the most significant changes in American food habits in recent years is the rapid increase in milk consumption.

A good heifer, well fed, will mature from one to three months sooner than one poorly fed—and will make a larger and better producer throughout her life.

Since vitamin C is destroyed in the rumen and is synthesized in the digestive tract beyond, as well as in other tissues of the body, its enteral administration is futile.

Pellagra, a disease long associated with unbalanced diets, was recognized as a deficiency condition in 1925, but not until the work of Elvehjem at Wisconsin, in 1937, was nicotinic acid or niacin demonstrated to be the missing factor. Milk is an excellent preventive for pellagra because it supplies niacin.—*National Dairy Council, Jan. 25, 1946.*

# EDITORIAL

## International Veterinary Congresses

Dr. Dragutin Homan, a Yugoslav veterinarian residing in Vienna, makes a timely plea (*Vet. J., 122,* (Jan. 1946): 12-20) for resumption of the four-year schedule of the International Congresses which were started in 1863 through the urge of Professor John Gamgee of Edinburgh, the founder of these international convocations, who, in April 1863, circulated hundreds of letters inviting the veterinarians of Europe to meet in Hamburg to discuss problems vital to the control of animal diseases and to submit proposals for their solution. The motive pertained to aggrandizing the international trade in cattle and cattle products and the high incidence of infectious diseases prevailing during the medial decades of the nineteenth century. The growth of these congresses in membership, countries participating, and scope of their programs has been phenomenal. The First Congress had 103 members from 10 countries, the Twelfth (New York, 1934), 3,341 members from 63 countries, and the Thirteenth (Zurich, 1938), 1,500 members from 65 countries. In each of the 13 Congresses, major questions of contemporary importance to the nations assembled were given predominance in respect to their scientific and technical aspects. A fraternal spirit among the veterinarians of the world was engendered by them and the social features of the more recent Congresses are long remembered.

The United States has been a national member since the Fourth Congress at Brussels in 1883, and Australia, in 1938, made the International Veterinary Congress a truly world organization—five continents were represented. Obviously, however, since the start, world character has always been an objective. Now that the world *is* small, that objective is inescapable.

Unfortunately, great wars disturbed the stated four-year interval between Congresses. Our War between the States (1861-1865) prevented this country from participating for twenty years; the Franco-Prussian War (1870-1871) interrupted the schedule for sixteen years; World War I (1914-1918) for sixteen years, and World War II has been responsible so far for an interruption of eight years without promise of early revival. The initiative taken by Dr. Homan in *The Veterinary Journal* will doubtless be underwritten by other veterinary journals from now on, until the next congress will be convoked somewhere. The time and the place will no doubt slowly crystallize into a reality.

Recalling the honor of having entertained the Twelfth International Congress in New York in 1934 and the pleasant memories of famous delegates from 63 countries, the stage here is already set for offering encouragement and support to the organization of the Fourteenth of these world-wide mobilizations of talented men devoted to the suppression of impoverishing infections. We subscribe to the sooner-the-better idea since, at no time in human history, has there been a greater need of a solid front in the world's veterinary service. Among veterinarians, the reasons are too well known to require amplification.

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## Ontario Changes Style of Veterinary Degree

The University of Toronto recently voted that graduates of the Ontario Veterinary College will hereafter receive the degree of Doctor of Veterinary Medicine (D.V.M.) instead of Bachelor of Veterinary Science (B.V.Sc.). The change will apply to the class graduated in May. Former graduates to whom the B.V.Sc. degree has been conferred may receive their D.V.M. by remitting $10.00 and the original diploma. Writes Dr. J. A. Campbell: "The change was made without a dissenting voice."

Worthy of note is the growing demand for admission. The next freshman class will number about 150. The aim is to accommodate veterans who desire to take a veterinary course.

## "Repeat" Presidents of the Association

Since the AVMA officers elected for 1944-1945 held over for a second term in 1945-1946, it is interesting to recall the men who have served as president of the Association for more than one year.

Although the Association is in its eighty-third year, having been organized in 1863, only 65 men have been honored with its highest office. The difference is accounted for by the reëlection, subsequent election after an interval, or by hold-over, of men who had previously served.

Of the 65 men who have been president of the Association during its eighty-two years, 53 had one-year terms and only 12 are conspicuous for having served more than one year. The 12, with their respective terms of office, are as follows:

*Two Years*

R. WOOD, Massachusetts, 1867-1869.
H. F. THAYER, Massachusetts, 1869-1871.
C. P. LYMAN, Massachusetts, 1877-1879.
J. L. ROBERTSON, New York, 1879-1881.
W. BRYDEN, Massachusetts, 1881-1883.
W. B. E. MILLER, New Jersey, 1883-1885.
C. J. MARSHALL, Pennsylvania, 1913-1915.
JAMES FARQUHARSON, Colorado, 1944-1946.

*Three Years*

A. LIAUTARD, New York, 1875-1877 and 1886-1887.
W. HORACE HOSKINS, Pennsylvania, 1893-1896.

*Four Years*

A. LARGE, New York, 1871-1875.
R. S. HUIDEKOPER, Pennsylvania, 1887-1889 and 1890-1892.

During its eighty-two years, the Association has had 21 different secretaries who have served for periods of from one to seventeen years. Those with terms of 5 years or more are:

*Five Years*

J. L. ROBERTSON, New York, 1869-1874.
W. HORACE HOSKINS, Pennsylvania, 1888-1893.

*Six Years*

N. S. MAYO, Illinois, 1913-1915 and 1918-1922.

*Seven Years*

SESCO STEWART, Kansas and Missouri, 1895-1902.

*Eight Years*

C. B. MICHENER, New York, 1880-1888.

*Seventeen Years*

H. PRESTON HOSKINS, Michigan and Illinois, 1922-1939.

During the same time, ten men have acted as treasurer of the Association. Those with the longest terms of service are:

*Eight Years*

WM. HERBERT LOWE, New Jersey, 1897-1903.

*Ten Years*

GEORGE R. WHITE, Tennessee, 1905-1915.

*Twelve Years*

JAS. L. ROBERTSON, New York, 1885-1897.

*Sixteen Years*

CHARLES BURDEN, New York, 1869-1885.

*Twenty-five Years*

M. JACOB, Tennessee, 1918-1943.

These five men alone served as treasurer for a total of seventy-one of the eighty-two years of the Association's existence.

## Rubber Deteriorates Penicillin

Penicillin in contact with natural rubber becomes partially or completely inactive according to Cowan (*Lancet*, Feb. 1945) who was first to publish that significant belief. The deterioration is more pronounced from the use of rubber tubing that has been frequently sterilized. Dr. Cowan estimates that in drop by drop medication the drug remains in contact with the tubing long enough to lose from 25 to 50 per cent of its efficacy.

Stammers (*Brit. Med. J.*, Sept. 1945) was able to demonstrate that synthetic rubber completely destroys efficacy of penicillin in a two-hour exposure and declares that natural rubber was found inoffensive.

While these diametrically discordant reports may sound like testimonials of rival rubber interests, neither can be set aside with impunity until the dispute is settled. Rubber and penicillin appear to be incompatible. Whether the contact accounts for certain incomprehensible failures in the use of penicillin remains to be seen.

# CURRENT LITERATURE

## ABSTRACTS

### DDT Toxicity

DDT is highly toxic to some animals and less so to others. Telford found that when DDT was fed to goats, the toxicity was transmitted to the milk, and that the cream was more highly toxic than the skimmilk. Of 20 white rats fed milk from 2 goats which had received single oral doses of DDT (1.25 Gm. and 0.68 Gm. per pound of weight), 11 died twenty-nine to thirty-one hours after administration, exhibiting typical symptoms of DDT intoxication. The milk remained toxic for approximately one week following a single feeding of DDT. — [*Horace S. Telford: DDT Toxicity. Soap and Sanitary Chemicals, Dec. 1945.*]

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### Chronic Bloat

Five cases of chronic or intermittent bloat were studied clinically and *post mortem*.

*Case 1.*—A cow that had a chronic cough, intermittent tympany, and progressive loss of weight, but no disturbance of rumination. Postmortem examination showed extensive involvement and enlargement of the posterior mediastinal lymph glands with tuberculosis lesions.

*Case 2.*—A cow which was tympanic constantly, did not ruminate, and passed fluid feces containing undigested feed. Postmortem examination revealed tuberculosis of the posterior mediastinal lymph glands and of the esophagus which they encircled.

*Case 3.*—A young cow suffering from a slight, chronic cough, continuous tympany of the rumen, and progressive loss of weight. Postmortem examination showed minor tuberculous lesions in lungs and associated glands. Close to the esophageal orifice, and originating in the rumen, was a tumor 9 inches by 6 inches which proved to be a squamous cell carcinoma.

*Case 4.*—Calf 9 months old, which for a considerable time had suffered from an extraordinary degree of tympany and abdominal distention, was found to have a large papilloma in the reticulum and a chronic dilatation of the rumen.

*Case 5.*—Yearling heifer showing for six months continuous tympany, cessation of rumination, poor appetite, and unthriftiness. An open safety pin was found free in the reticulum, and the anterior wall of this organ showed a local fibrous thickening. — [*E. W. Ascott: Chronic Tympany of the Rumen. Vet. Rec., 58, (Jan. 26, 1946): 39.*]

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### Colostrum Pregnancy Test in Cattle

The antigen for this test was prepared by collecting the material found in the mammary glands of first-calf heifers between five and eight and one-half months pregnant, diluting it with an equal volume of sterile saline solution and passing through a Berkfeld filter. This material was injected as near the surface as possible in the vulvar mucosa, using an intradermal syringe and a 25-gauge needle.

A total of 322 tests was made on 35 cows, and 17 tests on 2 freemartins. While there is a marked difference in response, the test is not sufficiently accurate to be used for pregnancy diagnosis in the bovine species.—[*Clyde F. Cairy: The Colostrum Pregnancy Test in Cattle. Am. J. Vet. Res., 6, (1945): 252.*]

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### Vitamin C in the Diet of the Silver Fox

A group of 5 whelps was fed a complete but vitamin-C free diet for ten months. A second similar group was given the same diet with 35 Gm. of cabbage per day added. A third group of 5 whelps received the basic diet plus 10 mg. of ascorbic acid. All of the animals were 11 to 12 weeks old at the beginning of the experiment. All developed normally. There was no essential difference between the weight curves of those on the vitamin-C free diet and the controls. The foxes were examined by a furrier who declared that all had normal coats and that there was no real difference between the groups. When the animals were sacrificed in ten months there were no demonstrable lesions of vitamin C deficiency. Determination of the vitamin C content of adrenal glands, spleen, liver, kidney, and heart revealed no differences between the three groups. Three groups of 4 guinea pigs each were placed on the same diets as the foxes. In three to four weeks all those on the vitamin-C free diet had died with typical signs of scurvy, whereas those given cabbage or ascorbic acid gained weight and developed normally. The author concludes that farm foxes do not require vitamin C in their diets.—[*Erling Mathiesen: The Importance of Vitamin C in the Diet of the Silver Fox. Svensk Vet.-tidskr., 32, (May 1942): 32.*]

ALFRED G. KARLSON.

### Army Remount Services

The functions of the Army Remount Services of Great Britain are listed as acquisition, conditioning, training, transportation, and issue of animals for military requirements.

At the beginning of the war in 1939, it consisted of one cavalry division in Palestine and a few pack companies in France. There was not much change until the Veterinary Corps was united with it, and veterinary officers took full charge. Before the end of the war, it had been built up to 130,000 animals of all kinds, and this was much below the numbers used by the Germans and the Russians. The Germans are said to have had one million horses with the troops facing the Russians, and the British army captured 60,000 in Italy and 20,000 in France and Germany.

One of the high points for the remount was the flying of 1,000 mules to support the Chindit expedition, some of these being dropped by parachute.

Dogs were not numerous at the start of the war, but showed their value particularly in guarding stores of supplies, a project in which no other measures had been able to control pilfering.

Food inspection, refrigeration, preservation, and transportation had not been developed on a basis even approaching that of the Veterinary Corps of the U. S. Army.—[*Lt. Col. D. A. Green: Army Remount Services. Vet. Rec., 58, (Dec. 1, 1945): 544.*]

## BOOKS AND REPORTS

### Report of Los Angeles Livestock Department, 1944-1945

This annual report for the year ending June 30, 1945, covering as it does an entire wartime year at the height of the military and naval operations at a center of congested installations and personnel, together with increased animal population and the release of veterinarians to the armed forces, is a booklet of unusual interest to the field of local livestock sanitary workers of a large metropolitan area with a vast rural surrounding such as Los Angeles County is known to be. To meet the pressure of war, the County Board of Supervisors obediently stepped up the dairy cattle population 20 per cent, imported a large number of horses for human and animal food, encouraged the unprecedented increase in egg and poultry production, and stimulated interest in home swine herds and backyard warrens. This accomplishment in the face of the manpower shortage, without sacrifice of the sanitary considerations involved, entitles the Los Angeles officials to the highest praise. The increase of dairy cattle from 35,023 in 1940 to 59,414 in 1945, without letting down the bars of high milk standards, stands out as the criterion. The total dairy cattle of the county was 112,970 in 4,724 herds, of which only 80 (0.095%) out of 83,772 tested had to be eliminated as reactors to the tuberculin test conducted by the veterinary staff. Other diseases among these herds were coccidiosis (*Eimeria zurnii*), verminous bronchitis, gastroenteritis, tumors, anaplasmosis, rabies (6 cases), shipping fever, mastitis, traumatic pericarditis, blackleg (3 cases), and various sporadic maladies.

Of 822 goats tuberculin tested, none reacted, nor were there any reactors among 69 goats tested for brucellosis.

Los Angeles County was again a large purchaser of horses: 2,500 per month for all purposes, including slaughter. The horse and mule supply came from Canada, Montana, Arizona, Texas, and New Mexico. Ponies sold freely at $200.00. The equine diseases pointed out were hemlock poisoning, loco weed poisoning, encephalomyelitis (1 suspect), and sundry ailments.

There were numerous outbreaks of vesicular exanthema in swine and of cholera among garbage-fed hogs. Most of the latter were vaccination breaks obviously due to the use of low or deteriorated potency virus. A 5-cc. dose of virus was recommended for feeder pigs. Salmonella infection occasioned grave losses. Influenza, mange, mycotic dermatitis, and swine erysipelas were recorded.

Greater interest in group action in the handling of poultry diseases has become more evident, in fact caused a surplus of eggs during the previous year. The diseases handled were coryza, laryngotracheitis, pullorum disease, cholera, pneumoencephalitis, fowlpox, infectious sinusitis, catarrhal enteritis (hexamitiasis) of turkeys, coccidiosis and, of course, the mine run of worm parasites and dietary troubles.

The report names the diseases encountered in rabbits, chinchillas, foxes, mink, pigeons, and canaries, together with means employed in their control, all-in-all summing up the wide scope of service in which a working force of veterinarians can participate for the public good. Apologies are made for research projects which had to be abridged or discontinued on account of shortage of material and personnel. The page devoted to the number and the value of the animals shows the vast invested capital that falls under the wing of this protective and promotional livestock department.—[*Los Angeles County Live Stock Department, 1944-1945 Report. Edited by Leslie M. Hurt, D.V.M., B.S.Agr., County Live Stock Inspector.*]

# THE NEWS

## More About the Eighty-third Annual Session

*Headquarters—Hotel Statler*
*Date—August 19-22, 1946*
*Place—Boston, Mass.*

At the monthly meeting of the Massachusetts Veterinary Association on February 27, the following men were unanimously selected to head the various local activities of the 1946 annual meeting.

OFFICERS

*General Chairman*—DR. E. M. ALDRICH, Boston.
*Honorary Chairman*—DR. H. W. JAKEMAN, Boston.
*Vice Chairman*—DR. G. B. SCHNELLE, Boston.
*Secretary*—DR. E. A. WOELFFER, Boston.

COMMITTEE CHAIRMEN

*Exhibits*—DR. A. H. RUSSELL, Concord.
*General Entertainment*—DR. B. S. KILLIAN, Somerville.
*Hotels and Housing*—DR. W. H. SHANNON, Dorchester.
*Meeting Rooms and Equipment*—DR. J. J. MURPHY, Cambridge.
*Military Activities*—LT. COL. R. S. YOUMANS, Lawrence.
*Reception*—DR. H. W. PEIRCE, West Medford.
*Registration and Information*—DR. C. THIBEAULT, Wakefield.
*Publicity and Public Relations*—DR. E. C. SCHROEDER, Arlington.

The Boston Statler—1946 Convention Headquarters

## Hotel Reservations To Be Made Through Housing Bureau

As announced in the March issue (page 192), a housing bureau has been arranged to facilitate and help allocate hotel accommodations in Boston for the convention. This is necessary because hotel facilities are not expected to be normal in many large cities during 1946.

For the convenience of those who are planning to attend the annual meeting, a list of hotels and the accommodations available, with prices, will be found on advertising page xxiii of this JOURNAL. Use the reservation blank provided and *mail it to the AVMA Housing Bureau, care of Convention Bureau, Boston Chamber of Commerce, not to the hotel.* Reservations must specify the day of arrival.

Hotel Statler, convention headquarters, has allocated several hundred rooms for AVMA members during convention week but is unable to set aside a sufficient number to accommodate all who may wish to stay there. Consequently, the housing bureau has made arrangements with several hotels within convenient distance of headquarters and will fill requests in the order of receipt and according to the choices indicated on the reservation blank.

## Board of Governors Meet

Chairman C. C. Hastings, President James Farquharson, and President-elect B. T. Simms were in Chicago on March 1 and 2 for a two-day session of the Board of Governors.

Dr. Farquharson announced completion of appointments to the new Council on Education as noted elsewhere in this issue. Other items of business included the following:

The Board received the application of the Veterinary Association of Manitoba for affiliation with the AVMA and referred it, with favorable recommendation, for action by the Executive Board.

A proposed trust agreement setting up a Board of Trustees to administer the AVMA Research Fund was recommended to the Executive Board for action.

Participation of the Association in the Fourth International Congress on Tropical Medicine now being planned for the United States in 1947 was approved and Dr. R. A. Kelser was named to represent the AVMA.

The Board authorized the executive secretary to issue an invitation to state and provincial examining boards to send representatives to a conference in Boston, during the annual meeting, to discuss with the Council on Education several problems that have arisen out of the war.

The tentative general plan of the Boston session was approved and the officers and committee chairmen selected by the Massachusetts Veterinary Association for the committee on local arrangements were confirmed.

Invitations were approved for President Farquharson to attend the following meetings: Southwest Cattle Growers Association, Albuquerque, March 19-20; American Animal Hospital Association, New York, April 16-18; Veterinary Association of Alberta, Canada, at Edmonton, week of July 4, and Veterinary Medical Society of Quebec in July or August. President-elect Simms also has a protracted travel schedule to attend state association meetings in Utah, Idaho, Montana, and the Pacific Northwest meeting in Portland, Ore., during the latter part of June and first part of July, which was approved by the Board.

Publication in the JOURNAL of a report on rabies by a subcommittee of the National Research Council was approved.

## Membership of Council on Education Completed

President Farquharson has appointed the members of the new Council on Education as provided for in the by-law amendment adopted at the business session last year. The branches of veterinary science represented and the terms of office are as follows:

*Large animal practice:* DR. C. C. HASTINGS, Williamsville, Ill., 1 year.

*Small animal practice:* DR. S. W. HAIGLER, St. Louis, Mo., 2 years.

*Governmental service:* DR. M. S. SHAHAN, Pathological Division, Bureau of Animal Industry, Washington, D. C., 3 years.

*Military service:* COL. SETH C. DILDINE, Quartermaster Depot, Chicago, Ill., 4 years.

*Public health:* DR. GARTH A. EDGE, Provincial Department of Public Health, Toronto, Ont., 5 years.

*Research and education:* DR. W. L. BOYD, Division of Veterinary Science, University of Minnesota, St. Paul, 6 years.

As previously announced in the JOURNAL, at the winter meeting of the Executive Board, the Executive Committee of the Council on Education was elected as provided by the new by-law. The members are:

*Basic sciences:* DR. W. A. HAGAN, New York State Veterinary College, Ithaca, 2 years.

*Clinical sciences:* DR. JAMES FARQUHARSON, Division of Veterinary Medicine, Colorado A. & M. College, Ft. Collins, 4 years.

*General Practice:* DR. W. A. AITKEN, Merrill, Iowa, 6 years.

These nine members will now proceed to elect a chairman and a secretary in order to complete the organization of the Council.

# APPLICATIONS

**The listing of applicants conforms to the requirements of the administrative by-laws—Article X, Section 2.**

## First Listing

AGUILERA, PABLO
Casilla 537, Santiago, Chile.
M.V., Escuela de Medicina Veterinaria, Universidad de Chile, 1944.
Vouchers: J. San Miguel and O. Bastias.

ANDERSON, COLLINS W.
914 W. National Ave., Milwaukee, Wis.
D.V.M., Iowa State College, 1941.
Vouchers: F. W. Milke and G. J. Marold.

BANNISTER, G. L.
c/o Ontario Veterinary College, Guelph, Ont., Can.
B.V.Sc., Ontario Veterinary College, 1939.
Vouchers: C. E. Phillips and J. H. Ballantyne.

BROCK, J. C.
Pelham, Ga.
D.V.M., Kansas State College, 1935.
Vouchers: B. E. Carlisle and I. G. Gauntt.

CARLTON, ROBERT E.
4743 Walnut St., Philadelphia 39, Pa.
V.M.D., University of Pennsylvania, 1945.
Vouchers: E. L. Stubbs and W. J. Lentz.

COLE, C. G.
P. O. Box 70, Ames, Iowa.
D.V.M., Iowa State College, 1906.
Vouchers: H. E. Biester and L. H. Schwarte.

EAGELMAN, JAMES G.
Wernersville, Pa.
V.M.D., University of Pennsylvania, 1937.
Vouchers: H. B. Roshon and R. S. Detwiler.

EDGE, GARTH A.
160 Redpath Ave., Toronto, Ont., Can.
B.V.Sc., Ontario Veterinary College, 1925.
Vouchers: A. L. MacNabb and F. W. Schofield.

GASOW, FRED H.
1521 N. Woodward, Birmingham, Mich.
D.V.M., Michigan State College, 1933.
Vouchers: W. N. Konde and D. L. Caswell.

HAUBRICH, LEONARD R.
Claremont, N. H.
V.M.D., University of Pennsylvania, 1911.
Vouchers: C. B. Place and C. L. Martin.

HESS, GEO. W.
316 Landrey St., Hillsboro, Ill.
D.V.M., Terre Haute Veterinary College, 1918.
Vouchers: A. K. Kuttler and T. K. Jones.

LAIDLAW, A. M.
c/o Dr. C. P. Zepp, 136 W. 53 St., New York 19, N. Y.
B.V.Sc., Ontario Veterinary College, 1945.
Vouchers: R. A. McIntosh and C. P. Zepp.

PARMITER, FREDERICK
25 Mount Pleasant Ave., Ottawa, Ont., Can.
B.V.Sc., Ontario Veterinary College, 1915.
Vouchers: G. A. Rose and O. Hall.

VAN NOCKER, KENNETH C.
614 N. Main St., Bellevue, Mich.
D.V.M., Michigan State College, 1933.
Vouchers: F. E. Stiles and M. M. Stiles.

ZACHERLE, GEORGE H. JR.
Hq. Army Medical Schools, Fort Sam Houston, Texas.
V.M.D., University of Pennsylvania, 1933.
Vouchers: E. L. Nye and L. R. Bower.

## Second Listing

Boardman, William, 175 Montgomery Rd., Westfield, Mass.
Collier, John R., 224 Ash St., Marysville, Ohio.
Eversole, Gardner S., 201 S. 5th St., Escanaba, Mich.
Fitts, Robertta L., 79 N. Main St., Chagrin Falls, Ohio.
Gitz, C. F., 1711 Mitchell Ave., St. Joseph, Mo.
Hall, A. V., P. O. Box 183, Basseterre, St. Kitts, B.W.I.
Hillman, Federico, Casilla 327, Los Angeles, Chile, S. A.
Jones, Frank M., Sidell, Ill.
Jones, William D., 180 Longwood Ave., Boston 15, Mass.
Kaplan, Martin O., Box 203, Kingston, R. I.
Klug, John H., Random Lake, Wis.
McBride, Frank, 262 William St., Tonawanda, N. Y.
Murphey, William, Box 747, Salesbury, Md.
Nelson, George W. I., 1234 N. Wilson Way, Stockton, Calif.
Nelson, Nels J. I., 3799 Broadway, Oakland 11, Calif.
Nuckolls, Melvin N., 1199 E. 66th St., Kansas City, Mo.
Pelot, William L., Rt. 1, Box 699, Joplin, Mo.
Reid, Fred E., 847 S. Iowa Ave., Washington, Iowa.
Ryan, Maurice H., Davis Veterinary Hosp., Post Road, Stamford, Conn.
Shannon, William H., 15 Clematis St., Dorchester 22, Mass.
Wardall, Murray N., 628-11th St., West Des Moines, Iowa.
Willetts, Janet M., 7056 Lanewood Ave., Hollywood 28, Los Angeles, Calif.
Williamson, Wallace L., 824 Grand Ave., St. Paul 5, Minn.
Zinober, Moses R., North Branch, Minn.
Zuniga, Eduardo, Puyehue 1360, Santiago, Chile, S. A.

## 1946 Graduate Applicants
## First Listing

The following are graduates who have recently received their veterinary degrees and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of junior chapters. Applications from this year's senior classes not received in time for listing this

month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

## Michigan State College*

Azelton, Robert P., D.V.M.
1312 Alice Ave., Lansing 15, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Bardens, John W., D.V.M.
Lowell, Ind.
Vouchers: S. Williamson and C. F. Clark.

Barton, Rebecca K., D.V.M.
309 Lake St., Oshkosh, Wis.
Vouchers: C. F. Clark and E. S. Feenstra.

Bigelow, Ralph E., D.V.M.
Diltz Road, Williamston, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Blair, Harry E., D.V.M.
R.R. No. 1, Danville, Ind.
Vouchers: S. Williamson and C. F. Clark.

Blake, James W., D.V.M.
3328 E. Michigan Ave., Lansing, Mich.
Vouchers: S. Williamson and R. A. Runnells.

Brown, Ross G. Jr., D.V.M.
610 College, Columbia, Mo.
Vouchers: C. F. Clark and E. S. Feenstra.

Byrd, Sherman C., D.V.M.
Francesville, Ind.
Vouchers: C. F. Clark and E. S. Feenstra.

Costello, Raymond C. A., D.V.M.
912 Monmouth St., Gloucester City, N. J.
Vouchers: C. F. Clark and E. S. Feenstra.

Cottongim, Okey W., D.V.M.
Brownsburg, Ind.
Vouchers: E. Ferree and C. F. Clark.

Decker, Winston M., D.V.M.
701 Michigan Ave., R. No. 2, Port Huron, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Dibble, Lyle W., D.V.M.
115 Exchange St., Marshall, Mich.
Vouchers: S. Williamson and W. O. Brinker.

Dinesen, Harald L., D.V.M.
5608 Edgewater Blvd., Minneapolis 7, Minn.
Vouchers: E. K. Sales and C. F. Clark.

Ezell, William A., D.V.M.
2809 Park Ave., Kansas City 3, Mo.
Vouchers: C. F. Clark and E. S. Feenstra.

Fishler, Julius, D.V.M.
255 Bogue St., East Lansing, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Goodband, Gordon G., D.V.M.
411 Dedham St., Newton Centre 59, Mass.
Vouchers: J. W. Cunkelman and E. K. Sales.

Harman, Jack P., D.V.M.
c/o Charles McCoy, Sr., Waseca, Minn.
Vouchers: C. F. Clark and E. S. Feenstra.

Heyt, Gerard J., D.V.M.
R.R. No. 2, 3 Mile Road, Grand Rapids, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Hird, Douglas M., D.V.M.
Box 239, R. No. 2, Farmington, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Howard, Raymond A., D.V.M.
14961 Warwick Road, Detroit 23, Mich.
Vouchers: W. G. Magrane and W. J. Westcott.

Jewell, Robert A., D.V.M.
193 Norton Ave., Pontiac 14, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Kingsbury, Frank W., D.V.M.
416 Park Lane, East Lansing, Mich.
Vouchers: C. F. Clark and C. S. Bryan.

LaBranche, Victor P., D.V.M.
32 Mechanic St., Haverhill, Mass.
Vouchers: J. W. Cunkelman and C. F. Clark.

Lashua, Elmer L., D.V.M.
446 E. Columbian Ave., Neenah, Wis.
Vouchers: J. P. Hutton and L. B. Sholl.

Loewith, David, D.V.M.
803 E. Grand River, East Lansing, Mich.
Vouchers: J. P. Hutton and C. S. Bryan.

Lowe, Joseph H., D.V.M.
Poseyville, Ind.
Vouchers: C. F. Clark and E. S. Feenstra.

McCluskie, Joseph D.
753 Grace Ave., Northville, Mich.
Vouchers: W. J. Westcott and E. K. Sales.

McDougle, Harold C., D.V.M.
Veterinary Dept., University of Missouri, Columbia, Mo.
Vouchers: W. Giltner and C. F. Clark.

Malloy, Mary Jane, D.V.M.
Rt. 7, Box 494A, Pontiac 7, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Metcalf, Frank Jr., D.V.M.
Amherst, Wis.
Vouchers: S. Williamson and E. K. Sales.

Milinsky, Harold C., D.V.M.
3820 Glendale, Detroit 6, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

Morrison, Edward J., D.V.M.
3 Rowe Pl., Franklin, N. J.
Vouchers: J. P. Hutton and W. W. Bailey.

O'Dell, Gilbert C., D.V.M.
1837 N. Main St., Lapeer, Mich.
Vouchers: J. W. Cunkelman and S. Williamson.

Ott, Bruce S., D.V.M.
833 Chew St., Allentown, Pa.
Vouchers: L. B. Sholl and E. K. Sales.

Rose, George M., D.V.M.
c/o Tom Patton, Huntsville, Mo.
Vouchers: C. F. Clark and E. S. Feenstra.

Rudesill, Robert L., D.V.M.
c/o L. C. Rudesill, R.R. No. 2, Baldwin, Wis.
Vouchers: E. T. Hallman and C. F. Clark.

Stickrod, Bernice E., D.V.M.
Windsor, Mo.
Vouchers: E. K. Sales and C. F. Clark.

Stirling, Neil B., D.V.M.
Clare, Mich.
Vouchers: C. J. Kershaw and C. F. Clark.

Stocking, Gordon G., D.V.M.
4128 Pelham Rd., Dearborn, Mich.
Vouchers: C. F. Clark and E. S. Feenstra.

### Texas A. & M. College

BLAKE, GRANT E.
660 W. Center, Provo, Utah.
Vouchers: G. T. Edds and F. P. Jaggi.

DIETZ, STERLING V., D.V.M.
Box 1295, McAllen, Texas.
Vouchers: R. C. Dunn and A. A. Lenert.

JULIFF, WALTER F., D.V.M.
Box 341, Colorado City, Texas.
Vouchers: E. D. Dwelle and F. P. Jaggi.

KELLEY, JACKSON C., D.V.M.
c/o Gilliam & Upshaw Pharmacy,
Waxahachie, Texas.
Vouchers: F. P. Jaggi and J. W. Barton.

KOERTH, CHARLES J. JR., D.V.M.
Oklahoma City 5, Okla.
Vouchers: S. S. Kreuz and G. T. Edds.

MOSELEY, WILLIAM T. JR., D.V.M.
Box 1088, Kingsville, Texas.
Vouchers: F. P. Jaggi and J. K. Northway.

PALMER, JACK S., D.V.M.
1517 Mier St., Laredo, Texas.
Vouchers: E. W. Dwelle and R. P. Marsteller.

PRATER, FELIX D., D.V.M.
Box 308, Monahana, Texas.
Vouchers: F. P. Jaggi and J. W. Barton.

RAPLEE, ROBERT G., D.V.M.
Palacios, Texas.
Vouchers: A. A. Lenert and R. D. Turk.

ROGERS, OWEN L., D.V.M.
3720 Stanford St., Dallas, Texas.
Vouchers: F. P. Jaggi and G. T. Edds.

### State College of Washington

HOLMES, MONROE A. JR., D.V.M.
905 N. Stafford St., Portland, Ore.
Vouchers: E. E. Wegner and J. E. McCoy.

### Second Listing

### Texas A. & M. College

Barcelona, Tony Jr., D.V.M., Box 629, Bryan, Texas.

### State College of Washington

Adler, Henry E., D.V.M., 1812 B St., Pullman, Wash.

Beddoe, Lloyd W., D.V.M., Harvey Rd., Pullman, Wash.

Benedictson, Barney D., D.V.M., P. O. Box 655, Tieton, Wash.

Bland, Edward C., D.V.M., 458-26th Ave., San Francisco 21, Calif.

Bush, Frank J., D.V.M., 34 Berkeley St., Lawrence, Mass.

Evans, Ivor, D.V.M., Tacoma Veterinary Hosp., Tacoma, Wash.

Gorham, John R., D.V.M., 1807 E St., Pullman, Wash.

Jakotich, Robert J., D.V.M., c/o Crawnell Stage, Eureka, Calif.

Jamison, Stanton L., D.V.M., 5032-13th Ave., Sacramento 17, Calif.

Julian, Logan M., D.V.M., 9589 S. W. Pacific Hwy., Portland, Ore.

Lindley, Dean C., D.V.M., c/o Troy Lindley, Colfax, Wash.

Miller, Frank E., D.V.M., 1408 Elliot Ave., W., Seattle 99, Wash.

Olsen, Robert W., D.V.M., 310 LaSalle Ave., Piedmont, Calif.

Parker, Horace, D.V.M., 217 Grand Canal, Balboa Island, Calif.

Peterson, Roy H., D.V.M., 434 S. W. 5th St., Pendleton, Ore.

Snow, Harold D., D.V.M., 2421 Wilshire Blvd., Santa Monica, Calif.

Taylor, Glenn E., D.V.M., Rt. 4, Box 2015, Modesto, Calif.

Ziegler, Walter, D.V.M., 3486-17th St., San Francisco, Calif.

## COMMENCEMENTS

### Agricultural and Mechanical College of Texas

At the commencement exercises of the Agricultural and Mechanical College of Texas on Feb. 2, 1946, Dean R. P. Marsteller presented the following candidates for the degree of Doctor of Veterinary Medicine:

Atlas, Joe
Barcelona, Tony, Jr.
Bilderback, William R.
Blake, Grant E.
Boaz, Wilson O.
Butchofsky, Robert L.
Crenshaw, Walter E.
Dietz, Sterling V.
Glaisyer, Arthur R., Jr.
Hendrickson, Thayer D.
Juliff, Walter F., Jr.
Kelley, Jackson C.
Koerth, Charles J., Jr.
LeJeune, John E., Jr.
Moseley, William T., Jr.
Nunn, John R.
Palmer, Jack S.
Pate, Walter E.
Prater, Felix D.
Raplee, Robert G.
Rogers, Owen L.
Ross, Jack B.
Strickhausen, George, III

### Cornell University

The first postwar refresher course for returning veterans began Jan. 7, 1946. A total of 34 men were enrolled in this course which gave four weeks of formal instruction in a scheduled program, followed by two weeks work in any type of field the man desired. Of the men enrolled, 17 are graduates of Cornell, five of the University of Pennsylvania, three of The Ohio State University, three of Kansas State College, two of Michigan State College, and one each of Colorado A. & M., Texas A. & M., Iowa State College, and Indiana Univer-

sity. Dr. C. D. Ebertz, Auburn, N. Y., and Dr. Robert F. Jewett, Cortland, N. Y., were enrolled in the course, but their pictures do not appear in the photograph.

Veterinarians, veterans of World War II, who finished in February, 1946, the first postwar refresher course in veterinary medicine for returning veterans at the New York State Veterinary College, Cornell University, Ithaca.

First row (left to right)—Capt. G. A. Faatz, Maj. J. S. Haley, Lt. Col. J. G. Eagelman, Capt. R. E. Whitehead, Capt. H. E. Viergutz, Dean Hagan, Dr. Stephenson, Capt. C. B. Frank, Capt. M. Erdheim, Maj. R. Steffen, Lt. J. Ferris.

Second row (left to right)—Capt. E. P. Chazy, Maj. G. E. Burch, Lt. R. H. Folsom, Capt. G. G. Tanenbaum, Capt. G. C. Lightcap. Lt. Col. R. P. Lawrence, Lt. I. W. Frock, Capt. R. E. Larson, Lt. Col. W. C. Todd, Capt. C. R. Kelsey, Capt. W. F. Tierney, Maj. J. E. Baker.

Third row (left to right)—Maj. R. O. Allen, Lt. Col. G. W. Snook, Dr. H. Siver, Lt. Col. C. D. Stefford, Capt. L. H. Terrill, Maj. B. Jeffers, Maj. B. Reinow, Lt. Col. D. V. Hughes, Maj. F. E. Perkins, Maj. E. A. Beckcom, Jr., Capt. J. W. Miller, Capt. H. B. Risley.

## Kansas State College

At the commencement exercises of Kansas State College, Jan. 25, 1946, Dean R. R. Dykstra presented the following candidates for the degree of Doctor of Veterinary Medicine:

Alt, Theodore W.
Beuschel, Lorenz L.
Boebel, Frederick W.
Bohmker, Fred A.
Borgmann, August R.
Burr, James H.
Church, John W.
Cook, Morley H.
Crawford, Dale I.
Duke, Lloyd M.
Easley, Glynden T.
England, Reid B.
Fellman, Clarence K.
Fenyk, John R.
Finkelstein, Alex B.
Gesellchen, Victor W.
Greathouse, Leonard F.
Haggard, John M.
Hardin, Russell W.
Harvey, Max J.
Jackson, William R.
Johnson, Marvin
Keesee, Paul A.
Keller, Garth V.
Kelly, Harold M.
Kern, Doyle E.
King, Robert K.
Kromminga, Myron C.
Levine, Isaac
Lightle, William T., Jr.
Lindsey, Paul J.
Litt, Robert P.
McClaughry, Larry E.
McCully, Samuel M.
McGown, Murlin L.
Maxfield, Albert L.
Nagakura, Roy S.
Nipper, Orris W.
Noordsy, John L.
Pritchard, William R.
Ratliff, Teddy B.
Ross, Erven A.
Runnels, Lewis J.
Scarr, David N.
Schultz, George W.
Shively, James N.
Sigars, Garold O.
Simon, Joseph
Snider, Lewis A.
Sorensen, Dale K.
Spangler, George W.
Spencer, Richard H.
Steinmetz, Hyman M.
Stuesser, Ralph H.
Sutcliffe, John W.
Swartz, Donald F.
Taylor, Kenneth E.
Theobald, William R.
Trotter, Donald M.
Van Walleghen, Albert K.
Waite, John R.
Walstrom, Veryl A.
Weckman, Dean K.
Weinman, Donald E.
Weiseth, Werner H.
Williams, Herbert R., Jr.
Williams, Raymond C.
Winchester, William J.
Woodbridge, John P.
Woods, George T.

## U. S. GOVERNMENT

**Swine Tuberculosis.**—Dr. A. E. Wight, in charge of the Tuberculosis Eradication Bureau, has directed our attention to the item on this subject in the January JOURNAL (p. 36). Figures for hogs slaughtered under federal inspection do not substantiate those published, in all respects, and are as follows: Of every 14 hogs slaughtered under federal inspection in the fiscal year 1945, one showed lesions of tuberculosis, and the percentage of retentions for the same period was 7.19, as compared with 6.91 for the preceding year.

The item did not hope to create the impression that all of this tuberculosis was of avian origin; for, although most of it probably is, some bovine type tuberculosis is still found among hogs slaughtered under federal inspection.

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**Slaughter of Horses in 1945.**—Inspected packing plants butchered a total of 77,887 horses in 1945, an increase of 49 per cent over the 1944 figure. The 68 public stockyards last year handled 266,683 head of horses during the year 1945, as against 220,858 for the preceding year. The number of horses going on the meat block has increased throughout the war years, despite the diminishing number of horses in the nation.—*Chicago Daily Tribune, Feb. 14, 1946.*

## AMONG THE STATES

### Alabama

**Annual Conference.**—The School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, conducted its twenty-first annual conference for veterinarians on Feb. 26-28, 1946. After an address of welcome by Dr. L. N. Duncan, president of the Institute, the program continued with the following papers:

Dr. H. C. H. Kernkamp, St. Paul, Minn.: "Differential Diagnosis of Swine Erysipelas and Its Control"; "Parasitic Diseases and Disorders of Swine and Methods of Control"; and "Diseases of Nursing Pigs."

Dr. S. W. Haigler, St. Louis, Mo.: "Mixed Bacterial Infections in Dogs and Methods of Diagnosis"; "Common Diseases of the Canine Eye"; and "Dentistry in Canine Practice."

Dr. J. C. Carey, West Liberty, Iowa: "Present Day Horse Practice"; "Dairy Cattle Practice"; and "Practical Surgical Operations in Bovine Practice."

Prof. F. E. Guyton, Auburn: "DDT: Its Uses and Limitations."

Mr. H. R. Smith, Chicago, Ill.: "The Prevention of Losses in Transporting and Marketing Livestock."

Dr. A. B. Larsen, Auburn: "Organization of Artificial Insemination Programs."

Dr. J. W. Scales, State College, Miss.: "Artificial Insemination of Dairy Cattle."

Dr. H. E. Moskey, Washington, D. C.: "The Pure Food and Drug Administration and Its Relationship to Veterinary Medicine."

Dr. R. C. Klussendorf of the AVMA, Chicago, Ill.: "The American Veterinary Medical Association," and "Milk and Its Relationship to Public Health."

Dr. J. K. MacNamee, Auburn: "Poultry Problems of the South."

Dr. H. W. Johnson, Auburn: "Survey of Diseases of Economic Importance in the Southeast."

Dr. B. N. Lauderdale, Montgomery: "Progress in Bang's Disease Control in Alabama."

The afternoon of each day was devoted to clinical demonstrations and operations, in which Drs. J. C. Carey, S. W. Haigler, H. C. H. Kernkamp, I. S. McAdory, B. M. Jolly, J. E. Greene, O. E. Jung, Jr., and W. L. Stroup participated.

The guest speaker at a banquet sponsored by the student chapter of the AVMA was Dr. D. M. Campbell, Chicago.

### Arkansas

**Veterinarian Needed.**—The local cheese factory receives milk from 325 families, and there is no veterinarian in the community. The county agent is a former vocational agriculture teacher, and he vaccinates the calves, pigs, etc. A man looking for a location might be able to contact the cheese factory and work out a retainer plan of some sort.

S/FRANK HURLBUT, *Yellville.*

• • •

**Southern Agriculture.**—The South is rooted in agriculture, and tending the roots which go out in far-spreading directions can make a more luxuriant and productive tree, says an editorial in *The Arkansas Gazette*, Dec. 24, 1945. Despite the growth in dairy and livestock populations, the South cannot yet meet its own minimum requirements of food of animal origin.

S/FRANK HURLBUT, *Yellville.*

### Canada

**Veterinarians Wanted.**—"Wanted for the Public Service of Canada" is the title of announcement of civil service examinations for the position of grade 1 veterinary inspectors in the Health of Animals Division of the Dominion Department of Agriculture. The examinations will be held this spring at coast to coast locations, selected according to the number of applications filed. The initial appointments are made at $2,400 per annum in lieu of the previous $1,800 to $2,400, with opportunities for promotion up to $4,200. In inter-

mediate grades appointees receive from $3,000 to $3,900, according to duties and responsibilities. The examinations are written. The subjects and weights are: anatomy, wt. 3; pathology, wt. 3; contagious diseases, wt. 7; and meat inspection, wt. 7. Candidates must be graduates of recognized veterinary colleges and meet the stated requirements in respect to citizenship, residence in Canada, and residence in locality. Certain preferences are given to veterans of World War I and World War II, who were residents of Canada at the time of enlistment, and are physically fit to perform the duties of the position for a reasonable time. Veterans are also exempt from specified age limits.

• • •

**Veterinary Association of Manitoba.**—The fifty-sixth annual meeting of the Veterinary Association of Manitoba was held in the Fort Garry Hotel, Winnipeg, on Feb. 8, 1946. In addition to the routine business, a number of unusual topics were discussed during the afternoon session. A change in the by-laws was approved whereby nonpracticing veterinarians could become members without the necessity of registration. After the reinstitution of the Western Canada Association had been reported upon, opinion was freely expressed that if the provinces east of Manitoba would undertake similar action the desired Dominion-wide veterinary organization would become a reality. A recent action of the Manitoba Government was dealt with at length. In an effort to provide veterinary service to an area where it was required, the Department of Agriculture had appointed a veterinary surgeon as civil servant, placing him on call for the ordinary fee of $1.00 per visit. This had been done without the knowledge or approval of the Association. Fear was expressed that a difficult situation might be arising and that possibly the Association's Act of Incorporation might be in danger. There being no Dominion organization from which support cold be anticipated, a motion was passed expressing the desire to affiliate with the American Veterinary Medical Association.

About 65 members and guests assembled for dinner, after which they were addressed by Dr. A. W. Trueman, president of the University of Manitoba. The speaker, in a happy mood, gained the confidence of his audience at once and it was regretted that he could not continue at greater length. Other guests included Dr. H. Hewitt, president, Saskatchewan Veterinary Association; Dr. James Farquharson, president, AVMA; Dr. M. Lougheed of the Winnipeg Health Department; and the Hon. D. L. Campbell, Minister of Agriculture for Manitoba.

Immediately after dinner the company assembled in the Macdonald Room. There it was honored by the presence of Dr. James Farquharson of Fort Collins, Colo., who, with the aid of superlatively good colored movie film, held his audience spellbound for four hours! At the conclusion of the evening, opinion was widely expressed that this had been the best and most instructive "clinic" ever held in Manitoba.

The following officers were elected for 1946-47: Drs. H. H. Ross, of Brandon, *president;* A. Savage, of Winnipeg, *vice president;* W. Hilton, of Winnipeg, *secretary-treasurer.*

s/A. SAVAGE

• • •

**Annual Meeting.**—The Ontario Veterinary Association met for its seventy-second annual convention at Niagara Falls, Ont., on Jan. 23-25, 1946. In addition to the reports of committees and officers, the following program was presented:

Dr. H. C. Stephenson, Ithaca, N. Y.: "Diseases of the Digestive System of the Dog."

Dr. D. H. Udall, Ithaca, N. Y.: "Calf Diseases" and "Mastitis in Dairy Cows."

Dr. A. L. MacNabb, Guelph: "The O. V. C. and Its Proposed Extension Program."

Dr. E. S. Archibald, Ottawa: "Soil Deficiencies and Its Relationship to Deficiencies in Domestic Animals."

Dr. W. F. Guard, Columbus, O.: "Surgery in Large Animals."

Dr. E. F. Johnston, Carp: "Ways and Means of Improving the Veterinary Profession."

Dr. F. F. Fehr, Buffalo, N. Y.: "Some Practical Suggestions in Small Animal Practice."

Dr. J. T. Akins, New Brunswick: "State Medicine in The Province of New Brunswick."

Dr. E. C. Phillips, Guelph: "Demonstration of Specimens and Discussion of Infectious Rhinitis in Swine."

Dr. A. A. Kingscote, Guelph: "Veterinary Education in Germany and Austria."

Officers elected for 1946 were: Dr. A. R. Campbell, Guelph, *president;* Dr. E. F. Johnston, Carp, *vice-president;* Dr. G. A. Edge, Toronto, *secretary-treasurer* and *registrar.* Dr. H. S. MacDonald, of Toronto, was elected chairman for the AVMA convention for 1947.

s/WM. MOYNIHAN, *Resident Secretary.*

## Connecticut

**Personal.**—Dr. Edward D. Lubin (U.P. '44) has resigned his position with the Fairfield-New Haven Breeding Association to establish a general practice at 29 Balmforth Road, Danbury.

## Florida

**The Tampa Fair.**—Over a million clicks of the turnstiles, representing that many admissions to the Tampa Fair in February, was pronounced an all-time world's record for attendance at an agricultural fair by Agricultural

Editor William H. Bischoff of the *Miami Daily News*. He points out also that the state's livestock developments are prodigious. In the production of beef cattle in the South, Florida stands third—Texas, Oklahoma, Florida—and for the whole nation, fourteenth, which, to say the least, is a significant trend in the livestock industry of this country. The beef-cattle population, valued at more than 50 million dollars, is growing by leaps and bounds, and the state is on the verge of being self-contained in poultry and egg production. Ranchers' Palomino and quarter-horse breeds are advancing to sizeable proportions. All-in-all, contrary to some beliefs, speaking from casual observation, Florida is not a backward livestock region. Interest in livestock is keen and general wherever information is sought; great credit is given to the scientists who are bringing about the transfiguration in land crops and farm animals. Most certainly, nowhere in the field of sport are the Thoroughbred horse and Greyhound dog getting a better break than at this winter playground.

• • •

**Upsurge in Livestock Production.**—A large acreage of range land not used for tillage crops is being turned to the raising of livestock. Herd improvement by careful selection and breeding is the order of the hour. Beef breeds predominate. Aberdeen-Angus, Shorthorn, Devon, and

*—Miami Daily News Staff Photo*

**Fig. 1 Roundup on a Florida Brahman breeding ranch near Oceola.**

Brahman are the principal breeds being introduced. Pasture land is being fenced and seeded to Bahia, Dallis, and Carpet grass. As no livestock forage is raised, the objective is marketing grass-fed cattle.

The principal poultry breeds are the White Leghorn and New Hampshire Red. Eggs and poultry are consumed locally. To the credit of the Florida farmer and commercial poultryman, they do a fine job of grading the eggs they put on the local market. Better tasting eggs would be hard to produce. Milk is produced under strict sanitary conditions and the cost and quality of bottled milk are practically the same as in the northern cities, gossip to the contrary.

Horses: The northern product has to come from Kentucky to entertain the customers, but

*—Ibid. Fig. 1*

**Fig.2 A pair of Brahman calves of the herd shown in figure 1.**

that we leave to the sports writers. However, we've seen, not far from Miami an audacious attempt of sizeable scale to create a new breed of horses — Palomino-Walking Horse cross — with special attention to preserve the golden blend for which the former is famous.—*L. A. M.*

• • •

**DDT and Bird Life.**—The islands comprising Miami Beach, at one time a veritable bird sanctuary, today are as birdless as Death Valley, and no one seems to know the cause. Perhaps, DDT has something to do with the migration for, with the first claims about that insect killer supreme, four years ago, someone (was it the Army or the Navy?) doused this beautiful landscape with DDT as a disease preven-

*—Miami Daily News Photo*

**The breeding of Brahma cattle—the sacred cow of India—is reaching a high estate in Florida. The picture is that of the grand champion, 1,900-lb. bull of that breed exhibited at the Tampa Fair.**

tive; several hundred thousand soldiers and sailors were in training here. The nearest to an opinion obtained about DDT and bird life was that of an officer at Key West, who observed that following the sprinkling of an island in that region with DDT, all the birds left with everything "insectivora" except the ants. The veterinary profession should be profoundly interested in these phenomena which seem to be closely related to the "balance of life" maintained by mundane creatures among themselves, but the question raised must be left for the entomologists to answer. Meanwhile, there is but to admit that DDT is an agent for the expert to handle without malice aforethought toward everything in lower life that the eye can't see nor the mind conceive.

## Illinois

**Veterinary College Staff Member.**—Dr. Roger P. Link (I.S.C. '34) has been made assistant professor and assistant chief of veterinary physiology and pharmacology at the University of Illinois. This is one of the first appointments

Dr. Roger P. Link

to the faculty of the College of Veterinary Medicine to be announced by Dean Robert Graham.

Dr. Link has taught veterinary physiology at Michigan State College and at Kansas State College. At the latter school, where he was a member of the faculty from 1935 until the present time, he rose to the rank of associate professor of veterinary physiology. He also carried on investigational work on anesthetics, and is author and co-author of several articles in this field.

**Inquiries About Veterinary College.**—Dean Robert Graham reports that he expects to enroll the first class of students in the new college of veterinary medicine in the fall of 1947. He has already received more than 400 inquiries from prospective students. Among this group are enough graduates of the Illinois College of Agriculture to make up more than one full class.

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**Attendance Record Established.**—The sixty-fourth annual meeting of the Illinois Veterinary Medical Association in January established a new attendance record, when 320 veterinarians and 119 ladies registered. The banquet was attended by 364 and many others were turned away for lack of facilities and food.

s/W. D. DAUGHERTY, *Secretary.*

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**Chicago Association.**—At the regular meeting held March 12, 1946, Dr. Oscar E. Nadeau, of the Augustana Hospital staff and professor of surgery, University of Illinois, spoke about "Some Recent Advances in Surgery."

s/R. C. GLOVER, *Secretary.*

## Indiana

**Research Department Enlarged.**—The Pitman-Moore Company has announced the arrival of Dr. Fred H. Schultz, Jr., to become a member of their research department. Dr. Schultz received an A.B. degree at Carthage College, Carthage, Ill., an M.S. and Ph.D. from the University of Colorado School of Medicine, and has completed post doctorate work in pharmacology at the Yale University School of Medicine. He has recently been engaged in teaching and research in aviation physiology while in the services of the U. S. Army.

## Iowa

**Association Office Moved.**—Faced with the possibility of being forced to vacate, the office of the Iowa Veterinary Medical Association has been moved to the Capitol City Bank Bldg., E. 6th and Locust Sts., Des Moines.

A new attendance record was set at the January meeting of the association with a registration of 527 veterinarians and 186 Women's Auxiliary members for a total of 713. More than 600 persons attended the annual banquet, and 69 new members joined the association.

s/C. C. FRANKS, *Resident Secretary.*

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**Cedar Valley Association.**—At a dinner meeting held at Waterloo on March 11, 1946, there was discussion of plans for the 1946 clinic of the Eastern Iowa Association to be held at Waterloo late in May. Dr. C. B. Strain, of Dunkerton, will act as chairman for the clinic and Dr. Grant B. Munger, of Cedar Rapids, as secretary.

**President of Fort Dodge Laboratories.**—Scott L. Barrett has been named president of Fort Dodge Laboratories to succeed Dr. D. E. Baughman. Mr. Barrett was general sales manager for the firm from 1919 until 1945.

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**In Memory of Dr. J. I. Gibson.**—I should like to explain that for a number of years, the late Dr. Gibson and myself had an agreement that the one of us who survived the other would have the special honor of saying a word in the nature of an eulogy to the other, who had departed.

It is not that the passing of Dr. Gibson is any more noteworthy than any of our other friends. It is only that I must fulfil the agreement.

That time seems to have come. We all know that "J. I." is dead—and the assumption is that I am still living, although few, if any of us, have ever lived as fully and completely as "J. I."

He was an entity within himself, possessing the faculty of leadership, whether the crowd was morose on account of the death of a fellow veterinarian, or gay because of an impending nice party. We have all heard that glorious booming voice, both as toastmaster and in the melody of song at many a banquet. We have also heard that same wonderful voice pitched in sadness at the funeral of a friend.

We think of Dr. Gibson as a colorful member of the "old school." In his time there were forged many weapons for the control of disease. It was during this period, as we all recall, that biologics made their advent into our realm. Dr. Gibson would relate how the use of one of these, tuberculin, would result in preventing the great loss by death and morbidity among man and animals, the like of which had never been approached by any other plague.

I don't know what sort of a measuring stick is used to determine the degree of greatness or goodness, or fineness of character that one has attained, but I do know that in his ability to deal out happiness or consolation to others, Dr. Gibson was in a class by himself.

"J. I." is gone, but the melody of his voice and his unselfish nature will keep step with us, and encourage us for a long, long time.

s/J. A. BARGER, *U. S. BAI, Des Moines.*

## Kansas

**Kansas City Association.**—The January meeting of the Kansas City Veterinary Medical Association featured talks by Dr. J. G. Hardenbergh, executive secretary of the AVMA, on the activities of that association, and of Dr. W. E. Petersen, St. Paul, Minn., on "Mastitis."

The program for the February meeting, presented by Dr. Earl Baldwin, of Omaha, Neb., consisted of a discussion of "Bovine Keratitis," with particular reference to *Haemophilus bovis.*

s/GAIL B. SMITH, *Secretary.*

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**Fire at State College.**—A fire in the veterinary clinic building on the evening of Feb. 19, 1946, completely destroyed the roof and damaged much of the interior of the structure. All of the animal patients were removed safely, all of the records were saved, and much of the equipment was removed before it had been damaged. Some parts of the building, saved from the fire, are already back in use; but much of the clinical work will necessarily be suspended until repairs and adjustments can be made. The fire necessitated cancellation of the refresher course which had been scheduled for March 4 to 30.

s/R. R. DYKSTRA, *Dean.*

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**Outstanding 4-H Club Boy.**—Albert Morgan, a member of the Welcome 4-H Club and president of the Geary County 4-H Club Council, has been selected as the first national winner of the Fidler award, which carries with the title of "Outstanding 4-H Club Boy" a $250 war bond, and a gold watch.

During 1945, he produced 6 baby beef steers, 114 Poland China hogs, 2 dairy animals, 220 head of poultry, 15 acres of oats, 10 acres of wheat, 55 acres of corn, 16 acres of kafir, 10 acres of sorghum, and 1/2 acre of potatoes.

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**District IV Meets in Wichita.**—On Feb. 9, 1946, veterinarians from District IV and guests from adjoining districts met in Wichita to hear Mr. Will J. Miller, State Livestock Sanitary Commissioner, and Dr. W. E. Logan, BAI inspector in charge.

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**Personal.**—Dr. S. L. Stewart, Olathe, suffered severe bruises and a partial fracture of the femur as a result of an accident while he was riding on a bus from Kansas City to Olathe. He was on his way home from the meeting of the Indiana Veterinary Medical Association, where he had been a guest speaker.

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**Personal.**—Dr. Don L. Mace has enrolled at Johns Hopkins University, Baltimore, Md., and is a candidate for the degree of "Master of Public Health."

## Kentucky

**Central Kentucky Association.**—The members of the Central Kentucky Veterinary Medical Association held a dinner meeting on Jan. 31, 1946. Discussion at the meeting centered on items pertaining to the joint meeting with the Southern Veterinary Medical Association to be held in Lexington on Sept. 30, Oct. 1-2, 1946.

Officers elected for the coming year are: Dr.

W. R. McGee, Lexington, *president;* Dr. E. R. Doll, University of Kentucky, *vice-president;* and Dr. E. W. Thomas, Lexington, *secretary-treasurer.*

s/E. W. THOMAS, *Secretary.*

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**Personal.**—Dr. D. W. Bruner (Corn. '37), released from his duties as a captain in the Veterinary Corps, has returned to the department of animal pathology at the University of Kentucky.

## Massachusetts

**February Meeting.**—The regular meeting of the Massachusetts Veterinary Medical Association was held Feb. 27, 1946. The entire evening was devoted to discussing the report submitted by the Committee on Reorganization and in formulating plans for the AVMA convention in August.

s/E. A. WOELFFER, *Assistant Secretary.*

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**Officers Elected.**—The following officers were elected on Jan. 23, 1946, at the annual meeting of the Massachusetts Veterinary Association: Dr. E. M. Aldrich, of Belmont, *president;* Dr. A. H. Russell, of Concord, *first vice-president;* Dr. H. W. Jakeman, of Boston, *secretary* (reëlected); Dr. L. A. Paquin, of Webster, *resident secretary* of the AVMA and delegate to the House of Representatives; and Dr. E. A. Woelffer, *assistant secretary.*

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**Personal.**—Dr. Rudolph H. Schneider has just completed twenty-five years of service with the Angell Memorial Hospital, according to *Our Dumb Animals.* During this time, he served in every capacity in the veterinary department, saw the hospital develop from its initial stages, and helped to plan and staff the Springfield branch. He was among the early users of nembutal anesthesia, and recently described an operation for correction of diaphragmatic hernia in dogs.

## Michigan

**Mine Detector in Veterinary Medicine.**—According to the *Lansing State Journal* (March 1, 1946), the War Assets Corporation reports the sale of a mine detector to a middle western veterinarian who expects to use it to locate foreign objects, before they cause damage, in a cow's stomach.

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**Microscopic Anatomy of Fowl To Be Studied.**—Under a grant of $15,600 from Swift & Co., Chicago, a two-year study of the microscopic anatomy of the fowl will be carried on by Michigan State College in coöperation with the U. S. Regional Poultry Research Laboratory.

## Minnesota

**Officers Elected for 1946.**—Before the close of the forty-ninth annual meeting of the Minnesota State Veterinary Medical Society on Jan. 30, 1946, the following officers were installed for the coming year: Dr. Carl Hansen, Faribault, *president;* Dr. E. H. Gloss, Gaylord, *president-elect;* Dr. H. C. H. Kernkamp, *secretary-treasurer* (reëlected).

The meeting was attended by 260 veterinarians and 72 wives and daughters. The largest group of new members, 24, for any one year was admitted to membership. This group included the first woman member of the association, Dr. Mary Joan Parent, who is the wife of Dr. Murray X. Parent, of Foley.

s/H. C. H. KERNKAMP, *Secretary.*

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**Farm Veterinarian Featured.**—The work of Dr. E. H. Gloss, of Gaylord, was featured in the *Minneapolis Sunday Tribune* of Jan. 27, 1946, with pictures and an account of his veterinary activities in rural Minnesota. In the day's work, Dr. Gloss was pictured in the *Tribune* performing a cesarean section on a cow, with Dr. E. J. Kading, of Gibbon, administering the anesthetic; injecting an udder in the treatment of mastitis; using a stomach tube to relieve bloat in a cow; and collecting a blood sample for brucellosis testing.

—*From Minneapolis Tribune.*

**Dr. Gloss, assisted by Mr. Ralph Cole of Gaylord, vaccinating a pig against hog cholera.**

The examination of a dog's mouth following

removal of an infected tooth, an autopsy on a chicken, and the vaccination of a pig depict the diversity of the veterinarian's practice.

The pictures, appearing on the day that Min-

*—From Minneapolis Tribune.*

**Dr. Gloss and Dr. Kading perform an autopsy on a chicken.**

nesota veterinarians were gathering for the forty-ninth annual convention of their association, served to remind everyone present that more and more people are watching the work of the veterinarian with increasing interest.

## Mississippi

**Fortieth Annual Meeting.**—The Mississippi State Veterinary Medical Association met in Jackson on Jan. 14-15, 1946. Following the address of President C. A. Allen, the scientific program included the following speakers:

Dr. T. A. Sigler, Green Castle, Ind.: "General Practice."

Dr. B. T. Simms, Washington, D. C.: "Coccidiosis of Calves" and "Parasites of Cattle."

Dr. L. A. Dykstra, Aurora, Ill.: "Hog Cholera Vaccine."

Dr. W. M. Coffee, LaCenter, Ky.: "Swine Diseases and Management."

Dr. V. T. Rose, Elkton, Ky.: "Cattle Surgery."

Dr. Clay Lyle, State Entomologist: "Uses of DDT on Livestock."

Mr. H. A. Kroeze, of the State Board of Health: "Uses of DDT from a Health Standpoint."

Dr. Henry Boswell, superintendent of the Mississippi State Sanitorium, was the guest speaker at the banquet.

s/G. G. GATES, *Secretary.*

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**Officers Elected for 1946.**—During the fortieth annual convention of the Mississippi Veterinary Medical Association held at Jackson on Jan. 14-15, 1946, the following officers were elected: Dr. L. L. Denson, Starkville, *president;* Dr. Billie U. Flynn, Canton, *vice president;* and Glenn Gates, Clarksdale, *secretary-treasurer* (reëlected).

## Missouri

**Dr. Elder Goes to Shanghai.**—Dr. Cecil Elder has been granted a year's leave of absence from his position as professor of veterinary science, Univerity of Missouri, to become a member of a group of 12 specialists on livestock disease who will do rehabilitation work in China under UNRRA. Headquarters will be in Shanghai.

## Nebraska

**State Association.**—The Nebraska State Veterinary Medical Association met in Lincoln, Dec. 11-12, 1945. The following program was presented:

Dr. W. E. Petersen, St. Paul, Minn.: "Science of Milk Production" (sound film).

C. A. Selby, M. D., State Director, Nebraska Department of Public Health: "Remarks on Public Health."

Dr. H. E. Biester, Ames, Iowa: "Some Swine Problems."

Dr. P. V. Neuzil, Blairstown, Iowa: "Poultry Practice by a Practitioner."

Drs. J. N. McIlnay, W. J. Moslander, P. K. Baker, and G. A. Ackerman, all Nebraska practitioners, conducted a panel discussion on "The Diseases and Treatment of Small Animals."

An interesting feature of the meeting was a joint session between the medical and veterinary professions on Tuesday evening. This was sponsored by the Nebraska Department of Public Health under the direction of Dr. Selby, and special consideration was given to brucellosis and swine erysipelas. Participating in this feature session were C. A. Selby, M.D.; C. H. Head, M.D., senior surgeon, USPHS, Kansas City, Mo.; L. O. Vose, director of laboratories, State of Nebraska Department of Health; and Dr. S. H. McNutt, Iowa State College, Ames. There was much favorable comment regarding this meeting, and it is a step forward in getting the most from our knowledge of diseases affecting both human beings and animals.

On the second day, the following program was presented:

Dr. H. W. Schoening, Washington, D. C.:

"Swine Erysipelas" (with film) and "Vesicular Diseases of Animals."

Dr. J. R. Snyder, Lincoln: "Report of Activities of the State Office."

Dr. J. W. Murdoch, BAI inspector in charge: "Report of Bureau Work in Nebraska."

Dr. James Farquharson, Ft. Collins, Colo., president of the AVMA, discussed the plans to raise funds to stimulate veterinary research and he also delivered greetings from the AVMA.

Dr. I. F. Huddleson, East Lansing, Mich., scheduled to appear on the program, was prevented by illness from doing so.

A highlight of the meeting was a panel discussion on "Diseases of Cattle". Dr. J. D. Ray, Omaha, was chairman and members of his panel were Drs. Pete Phillipson, S. W. Phillips, J. D. Cady, J. E. Weinman, and Frank Breed, all of Nebraska, and Prof. W. J. Loeffel, University of Nebraska.

The program of the ladies' auxiliary included luncheons, teas, shows, and special attractions.

The officers elected for 1946 were: Dr. W. I. Nelson, Herman, *president;* Dr. H. O. Person, Wahoo, *vice-president;* and Dr. L. V. Skidmore, Lincoln, *secretary-treasurer.*

Twenty-two new members were elected to membership in the association.

s/L. V. SKIDMORE, *Secretary-Treasurer.*

## New York

**County-wide Rabies Control.**—A plan for the control of rabies in Tompkins County was prepared by Dr. Alexander Zeissig, Ithaca. The county was selected as a basic unit because: It embraces the area most likely to be covered by a dog with the furious form of rabies, it makes for uniformity, and it is an economical unit. The county must organize its forces, educate its people, enforce the laws, and encourage (if desired) vaccination. Organization was begun before rabies was reported in the county, starting with the medical profession and, later, the public.

THE PLAN

The county health officer was in charge of the program, but a state district health officer can be used to advantage. He was assisted by a Rabies Advisory Council composed of two health officers, a veterinarian, the county dog warden (representing the humane societies), two dog owners (a kennel operator and an individual owner), and a member of the board of supervisors. Experience to date makes three points very clear:

The public relations officer is the key man in the success of any plan of this nature.

Isolation of dogs is a potent weapon, but it must include all dogs. One or two running at large nullify efficiency.

Vaccination is a valuable aid, but is secondary to isolation. To be fully effective, it must be subsidized so it will cost the dog owner little.

**Dogs Honored for Research Rôle.**—The first annual Whipple Prize "for outstanding services to mankind" was awarded to two Dalmatian dogs in New York City on Feb. 6, 1946, by Maj. Gen. Norman T. Kirk, Surgeon General of the Army. The award is named in honor of Dr. George H. Whipple, dean of the University of Rochester, School of Medicine and Dentistry,

*—From the New York Times*

**Surgeon General Norman T. Kirk, U. S. Army, confers the Whipple Prize upon Josie and Trixie, Dalmatians, at the Museum of Natural History in New York. Dr. Frieda S. Robbins and Albert Parr, director of the Museum, assist him.**

and was presented on behalf of the Friends of Medical Research, a voluntary educational organization.

The two dogs, Josie and Trixie, were selected for the prize—two leather collars bearing silver tags on which were described their services—for the significant part they played in experimental work on blood plasma during the war.

Dr. W. A. Hagan, dean of New York State Veterinary College, also participated in the exercises by reading the official citation and buckling the new collars on the dogs. He pointed out the contributions of animal experimentation to human welfare, saying:

"Not only human beings are helped by research with dogs, but dogs have benefitted, too, in discoveries relating to distemper, rabies, hookworm, and pellagra."

Surgeon General Kirk said that thousands of soldiers in World War II owed their lives to experimental researches in which dogs were used.

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**New York City Association.**—The meeting of March 6 was held at the Hotel Pennsylvania to hear Dr. Alexander Zeissig, veterinary con-

sultant of the division of communicable diseases, New York State Department of Health, outline the department's plan for rabies control.

S/C. R. SCHROEDER, *Secretary.*

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**Repeat Refresher Course.**—The New York State Veterinary College at Cornell University, Ithaca, announces a second postwar refresher course of three weeks duration, beginning June 3, 1946. Because of the housing situation, only 35 members will be accepted; and special mention is made of the fact that no apartments are available. Inquiries and applications should be addressed to Dr. H. C. Stephenson, director of Refresher Courses, New York State Veterinary College, Ithaca.

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**New York City Association.**—The regular February meeting of the Veterinary Medical Association of New York City was held on Feb. 6, 1946. Dr. Joseph DeVita, of New Haven, Conn., presented "Some Observations on the Sex Hormones."

S/CHARLES E. FANSLAU, *Program Chairman.*

## Ohio

**County Meat Inspection.**—The Fayette County Board of Health recently passed regulations to control the inspection of meat in Fayette County. These regulations use the United States BAI regulations parts 259, 260, 261, 263, 264, 265, and 268 concerning antemortem and postmortem inspections, disposal of diseased carcasses, and methods of processing. Our regulations further call for regular inspections of meat markets and require these markets to have adequate water supplies, washing sinks, and toilet facilities. Inspection reports are made on forms provided by the Board.

The regulations have been in force three months and during that time I have encountered many interesting incidents. This one was told to me by a veteran butcher, Mike Helfrich. It occurred at the turn of the nineteenth century in Cincinnati. Mike was apprenticed to Winter Brothers Packers who had a slaughter plant at Sedamsville, Cincinnati.

Cincinnati was at that time probably the leading meat packing center, and meat inspection was just being instituted. A new inspector was watching the beef kill. A steer had been killed and bled but it had bled inwardly developing a large blood clot in the thoracic cavity. When the butchers split the chest one pulled the clot out and then exclaimed that it was an awfully funny looking liver. The new inspector hastened over, looked at it, then, probably thinking it was anthrax or blackleg, announced the carcass would have to be condemned. Just as he was in the act of condemning it the boys showed him the real liver.

Mike also recalls that Winter Brothers had markets at Smith and John Streets and at Baymiller Street in Cincinnati. He remembers that some of the finest beef they killed were fed on distillers' grains and mash at the old Fleischmann Distillery on Sedam Street.

WM. BOLTON, D.V.M., *Sanitarian.*

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**Fourth Brother Becomes Veterinarian.**—When Wilbur C. Crago, of Chagrin Falls, received his degree on March 15, 1946, he was the fourth member of his family to become a veterinarian, according to *The Columbus Citizen* (Feb. 26, 1946). The others are his brothers, Drs. Joseph V., of Warren; Charles C., of Youngstown, and Verle, of Kinsman.

The Cragos are the second set of four brothers to take veterinary degrees at O.S.U., being preceded by the Merrick brothers, Drs. James R., of Lakeside, and Byron B., of Berlin Heights, Ohio; and Andrew L., of Brookfield, and Gerald B., of Elmhurst, Ill.

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**Personal.**—Dr. W. M. Strawn (O.S.U. '39) has resumed practice with Dr. Geo. L. Frese, Toledo. Dr. Strawn entered military service early in 1941 and served as commanding officer for the Veterinary Corps at Camp Perry, Ohio, for almost three years before going to the Philippine Islands and the southwest Pacific. He had attained the rank of major at the time he was released from service.

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**Correction.**—In the February, 1946, issue of the JOURNAL we carried a "highlight" by Dr. A. G. Madden regarding the use of di-sulfalac, but erred in saying that it contained sodium thiosulfate; this should have been sodium sulfathiazole.

## Oklahoma

**State Meeting.**—The Oklahoma Veterinary Medical Association held its thirty-first annual meeting at Oklahoma City, Jan. 7-8, 1946. Attendance broke all previous records. Featured speakers on the program were:

Dr. James Farquharson, Ft. Collins, president of the AVMA: "Surgical Technique" and "One Day's Practice," both illustrated by moving pictures.

Dr. C. S. Bryan, Michigan State College, East Lansing: "What is Mastitis?" and "The Treatment of Mastitis."

Mr. H. C. Schaefer, Ralston Purina Mills, St. Louis, Mo.: "Nutritional Requirements of the Dog."

Mr. R. L. Cuff, Livestock Loss Prevention Board, Kansas City, Mo.: "Cattle Fly, Louse, and Grub Control."

H. H. Turner, M.D., Oklahoma University Medical School, Oklahoma City: "The Endocrines and Their Functions."

Dr. H. R. Hassler, director of State Health Laboratories, Oklahoma City: "That Question of Rabies."

Dr. Herman Farley, Oklahoma A. & M. College, Stillwater: "Anaplasmosis."

Dr. F. Perrin, Norden Laboratories, Grand Island: "Extrinsic Factors of Some Swine Diseases."

Dr. N. L. Astle, Blackwell: "Artificial Insemination."

The officers elected for 1946 were: Dr. J. P. Denton, Pryor, *president;* Dr. N. L. Astle, Blackwell, *vice-president;* and Dr. C. H. Fauks, Oklahoma City, *secretary-treasurer* (reëlected).

A banquet, followed by entertainment and a dance, was unusually well attended. A noon day luncheon for the ladies of the auxiliary was held on the second day.

s/C. H. FAUKS, *Secretary-Treasurer.*

## Pennsylvania

**Keystone Association.**—At the meeting of the Keystone Veterinary Medical Association held on Jan. 23, 1946, the guest speaker, Dr. Ralph B. Little, of Princeton, N. J., spoke on "Bovine Mastitis."

s/RAYMOND C. SNYDER, *Secretary.*

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**Veterinary Window Display.**—A window display was prepared by members of the Pennsylvania State Veterinary Medical Association and installed at 52nd St. and Cedar Ave., Philadelphia. The display, built around the theme "What the Veterinary Profession Means to Mankind," contained prepared materials depicting tuberculosis in cattle and poultry, filariasis in dogs, nodular disease in sheep, and damage by the cattle grub. A center card, bearing the emblem of the Pennsylvania State Veterinary Medical Association, was flanked by an emblem of the Keystone Veterinary Medical Association and one of the AVMA.

The interesting and educational display drew much favorable comment during the three weeks that it was in place.

s/RAYMOND C. SNYDER, *Secretary.*

## South Carolina

**Dr. Lewis Retires.**—Dr. W. K. Lewis retired at the close of Jan. 31, 1946, as inspector in charge for the United States Bureau of Animal Industry, state veterinarian for South Carolina, and director of the Clemson Agricultural College Livestock Sanitary Department. Dr. Lewis entered bureau service June 15, 1903, and was stationed at National Stock Yards, Illinois, in meat and stock yard inspection. In 1908, he was transferred to Texas on tick eradication work in the Panhandle, with headquarters at Stamford. He was on stockyard inspection at Fort Worth also. Returning to the National Stock Yards in 1909, he was transferred in the spring of 1910 to Atlanta for tick eradication work in Georgia, Florida, and South Carolina. In April, 1914, he was made inspector in charge of tick eradication in South Carolina for the BAI and the State of South Carolina. He later assumed charge of bovine tuberculosis eradication and hog cholera control for both the United States BAI and the State of South Carolina. On July 1, 1920, he was appointed state veterinarian and director of Clemson Agricultural College Livestock Sanitary Department, continuing in office until his retirement.

Dr. W. K. Lewis

According to Dr. Lewis, he expects to remain in his native state, South Carolina, and wishes "to live in a house by the side of the road and be a friend to man."

## South Dakota

**Annual Meeting.**—The annual meeting of the South Dakota Veterinary Medical Association was held at Sioux Falls, Feb. 6-7, 1946. The scientific program contained the following numbers:

Dr. James Farquharson, Ft. Collins, Colo., president of the AVMA: "Large Animal Surgery" (illustrated).

Dr. G. S. Harshfield, Brookings: "South Dakota Sheep Diseases."

Dr. A. B. Hoerlein, Brookings: "Ringworm Infection in Animals."

Dr. Neil Plank, BAI inspector in charge: "Avian Tuberculosis Control in South Dakota."

Dr. R. S. Robinson, Pierre: "Report by South Dakota State Veterinarian."

Dr. A. R. Schmidt, Triumph, Minn.: "Diseases of Cattle."

Dr. Greg Raps, Iowa State College, Ames: "Artificial Insemination of Cattle."

Dr. H. E. Biester, Iowa State College, Ames: "A Discussion of Some Nutritional Problems of Swine."

Dr. J. E. Peterman, Lincoln, Neb.: "Swine Erysipelas" and "Vesicular Diseases of Animals" (illustrated).

**Sheep Parasite Control.**—A round-table discussion of sheep parasite control to improve market quality was held at Watertown, Oct. 24, 1945. Dr. L. D. Frederick, chief veterinarian, Swift & Company, Chicago, acted as chairman.

Dr. G. S. Harshfield, college veterinarian, Brookings, stressed the fact that management has a primary consideration and treatment occupies second place.

Dr. M. Spolum, Watertown, reported that his clients withhold salt for three days before giving phenothiazine (1 part) and salt (9 parts) mixture.

Dr. R. S. Robinson, Live Stock Sanitary Board, Pierre, emphasized the necessity of making a proper diagnosis because results from the use of phenothiazine can only be expected where its use is indicated; it cannot correct trouble which is not of a parasitic nature.

Dr. Neil Plank, BAI inspector, of Pierre, expressed the opinion that the bureau veterinarian, the state veterinarian, and the flock owner must work together for most effective results.

## Texas

**Woman's Auxiliary Meeting.**—Mrs. T. T. Christian, of Waco, addressed a meeting of the Woman's Auxiliary of the Texas Veterinary Medical Association on Jan. 15, 1946, using as her subject, "Accomplishments of the Veterinary Profession," in which she reviewed the work of Dr. Mark Francis who found that tick fever was carried and spread by the cattle tick, thus opening the way for additional work which showed that mosquitoes are vectors of yellow fever, malaria, typhus, and encephalomyelitis, and that ticks spread Rocky Mountain spotted fever. Mrs. Christian also mentioned the work of Dr. D. F. Luckey in connection with the intradermal tuberculin test, of Drs. Dorset, Niles, and McBryde with hog cholera serum and virus, of Dr. I. F. Huddleson with undulant fever and brucellosis, and of the Veterinary Corps and its work in the inspection of foods for military personnel.

s/MRS. E. A. GRIST, *Publicity Chairman.*

## Wisconsin

**Officers Elected**—At the annual meeting of the Wisconsin Veterinary Medical Association in January, the following officers were elected for 1946: Dr. Clarence Otteson, of Edgerton, *president;* Dr. C. E. Hammerberg, of New London, *vice-president;* Dr. W. L. Richards, of Morrisonville, *treasurer* (reëlected); and Dr. B. A. Beach, Madison, *secretary* (reëlected).

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**Central Association.**—The Central Wisconsin Veterinary Medical Association will meet in Eau Claire on April 10, 1946, to hear Dr. C. F. Schlotthauer, Rochester, Minn., discuss "Mastitis in Dairy Cows" and "Nervous Disorders in Dogs." Dr. R. C. Klussendorf, of the AVMA, Chicago, Ill., will speak on "Raising Calves."

s/S. K. ANDREASSEN, *Secretary.*

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**Look Magazine Pictures Veterinary Medicine.**—Dr. T. H. Ferguson, of Lake Geneva, was featured in a series of pictures entitled "Animal Doctor" in the Dec. 11, 1945, issue of *Look.* Three of the pictures from that series are reproduced herewith.

*—From Look Magazine.*

**Dr. Ferguson is completing the injection of sulfanilamide in oil through the teat canal while treating a cow infected with mastitis.**

*—From Look Magazine.*

**Careful examination of the lungs is needed to determine the degree and extent of involvement in shipping fever.**

*—From Look Magazine.*
**A boy's dog presented for examination and treatment of an ear ailment.**

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**Personal.**— Dr. Herbert L. Marsh (I.S.C '43) has taken over the practice of the late Dr. Fred W. Miller, of Whitewater. Dr. Marsh, entering the Veterinary Corps upon graduation, completed more than 30 months of overseas duty in the South Pacific and CBI Theaters "with horse and mule outfits all the way" before he was released in December. He had been with Dr. Miller since January 1, 1946.

## FOREIGN

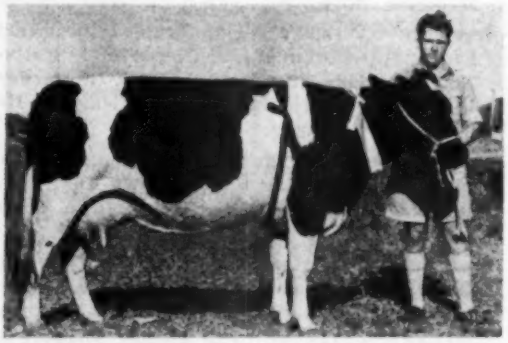
### France

**Changes in the Veterinary Service.**—The prewar status of veterinary societies which was shattered by decrees in German-occupied territory and also by the Vichy Government is in a stage of reconversion. The *Syndicat National des Vétérinaires*, a voluntary federation of departmental and special groups, like the American Veterinary Medical Association and the National Veterinary Medical Association of Great Britain and Ireland, was abolished by dictatorial decrees in June, 1940, and replaced by the *Ordre des Vétérinaires* and all veterinarians were compelled to participate. The reason, a commentator writes, was to enhance the dignity of the veterinary profession and for the first time put it under a definite discipline in true Nazi fashion. (All of the other learned professions were brought under the same yoke.) The *Syndicat* which was automatically restored with the downfall of Vichy has had a progressive career. It had the doctorate degree established for diplomates of the national veterinary colleges and former graduates who complied with specified requirements following World War I. In 1938, it brought about the passage of a law prohibiting practice by nongraduates with the usual exemption of existing ones during their lives.

The *Ordre des Vétérinaires*, with its compulsory membership, maintained a central office in Paris and put up a strong front throughout the country during the war. Now that the *Syndicat* is reëstablished, the good points of both are being reëxamined. The Provisional Government is studying the enactment of laws delegating scientific development to the syndicate and exclusively disciplinary functions to the other.

### Palestine

**Cattle Show in Beer-Tuvya.**—According to Captain I. M. Saturen, V. C. (U.P. '37), the cow pictured was grand champion of a cattle show held in the Jewish colony of Beer-Tuvya. The picture and report of the show appeared in



*—From Hassadeh, September,* 1944
**Grand champion of the show, and daughter of a native bull.**

*Hassadeh* (Sept., 1944), published in Tel-Aviv. The cow, daughter of a native bull, is credited with producing 4,266 kg. (9,385 lb.) of milk and 163 kg. (358 lb.) of butterfat in 354 days at the age of 2 years. Her average test was 3.82 per cent.

### Philippines

**Veterinary College Planned.**—A veterinary college and agricultural high school is being planned to operate in conjunction with Hacarin Dairy Farm. This farm has Holstein-Friesian and Jersey cattle, Poland China and Duroc Jersey hogs, White Leghorn and Rhode Island Red hens.

s/Vicente A. Araneta.

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Pigs should be castrated at 4 weeks, vaccinated with serum and virus at 6 weeks, weaned at 9 weeks, and marketed at 6 months, according to veterinarians engaged in swine practice.

## COMING MEETINGS

Conference on Bovine Brucellosis. Baltimore, Md., April 9-10, 1946. A. L. Brueckner, Live Stock Sanitary Service, 816 Fidelity Bldg., Baltimore 1, Md.

American Animal Hospital Association. Hotel Pennsylvania, New York, N. Y., April 16-18, 1946. R. E. Ruggles, P. O. Box 303, Moline, Ill., secretary.

Missouri Veterinary Medical Association. Springfield, Mo., June 10-11, 1946. J. L. Wells, 1817 Holmes St., Kansas City 8, Mo., secretary.

Ohio State University. Annual Veterinary Conference. College of Veterinary Medicine, Ohio State University, Columbus, June 12-14, 1946. Walter R. Krill, College of Veterinary Medicine, dean.

American Veterinary Medical Association. Eighty-third Annual Meeting. Hotel Statler, Boston, Mass., Aug. 19-22, 1946. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Eastern Iowa Veterinary Association, Inc. Hotel Montrose, Cedar Rapids, Iowa, Oct. 15-16, 1946. C. C. Graham, Wellsburg, Iowa, secretary.

American Public Health Association. Cleveland, Ohio, the week of November 11, 1946.

Chicago Veterinary Medical Association. Palmer House, Chicago, Ill., the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

New York City Association. Hotel Pennsylvania, New York, N. Y., the first Wednesday of each month. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

## BIRTHS

To Dr. (I.S.C., '37) and Mrs. Raymond A. Gathmann, 835 Columbia Ave., Franklin, Tenn., a daughter, Rita Rae, Jan. 1, 1946.

To Capt. (Tex., '43) and Mrs. Fred W. Baker, 305 P. O. Bldg., Green Bay, Wis., a son, Bruce Alan, Feb. 25, 1946.

To Dr. (Wash., '40) and Mrs. John Lee Wilbur, Jr., Box 981, Emmett, Idaho, a son, John Lee III, Dec. 14, 1945.

To Dr. (M.S.C., '39) and Mrs. Harold T. Rose, Lang Ridge Road, Stamford, Conn., a son, Andrew Charles, Dec. 25, 1945.

To Capt. (Tex., '44) and Mrs. Arthur L. Hogge, Jr., 733 E. Johnson, Madison, Wis., a son, Arthur Lee III, Dec. 30, 1945.

To Dr. (Corn., '43) and Mrs. Leo R. Karmin, 390 Eastern Parkway, Brooklyn 25, N. Y., a son, Andrew, Jan. 8, 1946.

To Dr. (O.S.U., '43) and Mrs. Harold D. Jacobs Jr., 1721 Emerson Ave., Dayton 6, Ohio, a daughter, Pamela Dee, Jan. 9, 1946.

To Dr. (M.S.C., '41) and Mrs. M. H. Sherber, 124 E. 17th, Ada, Okla., a daughter, Karen Sue, Jan. 13, 1946.

To Dr. (Wash., '42) and Mrs. Harold F. Henig, P. O. Box 706, Turlock, Calif., a son, Gary Dwight, Feb. 3, 1946.

## DEATHS

**W. G. Gillam,** 75, Vancouver, B.C., died Feb. 15, 1946. Dr. Gillam had been secretary of the British Columbia Veterinary Association for twenty years.

**J. T. M. Hughes,** 65, Duncan, B.C., died recently. Dr. Hughes was with the Dominion Health of Animals Division for seventeen years before taking up practice at Duncan.

**V. S. Jacobi** (McK. '18), 51, of Watertown, Wis., died Feb. 20, 1946. Dr. Jacobi entered veterinary practice near his birthplace, Bunker Hill, Ill., after serving in World War I. Later, when serving in the BAI, he settled in Watertown.

**T. J. McCabe** (C.V.C. '18), 58, Mt. Pleasant, Iowa, died Feb. 7, 1946, following an illness of several weeks. Before entering private practice at Mt. Pleasant, Dr. McCabe had served as a district veterinarian for the state.

**L. E. Maddocks** (U.P. '15), 56, of Monroe, La., died Feb. 15, 1946. He had practiced in Gardiner, Maine, and Lewiston, Maine, until 1936, when he came to Louisiana with the BAI.

**F. W. Miller** (O.S.U. '16), 54, Whitewater, Wis., died Feb. 9, 1946. Dr. Miller received his M.S.A. in 1921 from Oregon State University, where he later served as associate professor, leaving there in 1925 to become senior veterinarian and physiologist of the BDI until 1937. At that time, he settled in Whitewater as a practicing veterinarian. Dr. Miller was admitted to the AVMA in 1919. He was also a member of the Helminth Society at Washington, the Smithsonian Institute Society, and the Washington Biology Society. He was well known for his work in brucellosis in cattle, and the physiology of production and reproduction in dairy cattle.

**E. B. Zickefoose** (K.S.C. '39), 32, Rossville, Kan., died in Hood River, Ore., on Dec. 29, 1945. Last year he was elected mayor of Rossville, which office he held at the time of his death. Dr. Zickefoose was a member of the Kansas Veterinary Medical Association and was admitted to the AVMA in 1939.

# THE VETERINARY PROFESSION AND THE WAR

## Veterinary Service in Germany Under MG

"Under Military Government, the veterinary service in Germany deals primarily with matters of importance to public health and economics. The prevention and control of animal diseases not only reduces the transmission of certain of these diseases from animals to man but also checks great losses in essential live-

This photograph, taken at the time the Military Government regulations for controlling the German civilian veterinary service were being prepared, shows (standing) Major Philip Carter (K.S.C. '26), of Minneapolis, Minn., MG veterinary officer for the Western Military District, U. S. Zone; (seated, left to right) Major Robert D. Courter (I.S.C. '36), of Richmond, Va., veterinary consultant, G-5, Public Health Branch, USFET; Lt. Col. Frank A. Todd (I.C.S. '33), of Charlottesville, Va., chief, veterinary affairs, OMGUS, USFET; Major Carl Groppe (O.S.U. '32), of Wheeling, W. Va., MG veterinary officer for the Eastern Military District (Bavaria), U. S. Zone.

Twenty-two U. S. Veterinary Corps officers have been directly connected with this work in Military Government, but the number has been reduced as the German veterinary service has become more firmly established.

stock food resources. A successful veterinary program thus benefits the mission of occupation by promoting German food production from livestock sources." Thus reads the first paragraph of a brief article under the title "Germany's Livestock Being *Vetted* by MG" in the Military Government (U. S. Zone) *Weekly Information Bulletin*,* (Jan. 12, 1946).

According to this report, the German veterinary service was once an efficient organization built up around a framework of government veterinary officials, who furnished regular and detailed reports of all communicable diseases of livestock. It instigated and maintained control measures and quarantine restrictions, provided diagnostic and laboratory service to prevent the spread of animal diseases, and set up a veterinary inspection service for meat, milk, and related foods of animal origin. Research facilities and institutions of learning were also maintained as a part of the German veterinary service.

These services were gradually halted by the progress of the war, and after the end of the war the United States policy of denazification brought about the dismissal of a large percentage of government officials from their former positions. Gradually, a system of disease reporting was devised and laboratories for diagnostic service and biological production were again put into operation. At the present time, most of the official positions have been filled with approved and qualified individuals, so that reports on communicable animal diseases are being submitted regularly and in much the same manner as they were prior to the war.

Many types of diseases are reported each month and several are giving the veterinary service much concern at this time.

Glanders, which appeared for the first time in many years, was found in Wehrmacht horses imported from other countries, and is being eliminated by testing all horses.

Hog cholera, a relatively rare disease in Germany, is being controlled by disinfection, quarantine, and immunization with crystal violet vaccine to which the German veterinarians are now being introduced.

Because the Allied armies, advancing so rapidly, disrupted the customary vaccination program, swine erysipelas is present generally throughout Germany. Quarantine and vaccination are being used to bring it under control.

Foot-and-mouth disease, which affects only cloven-hoofed animals, is present in all countries of Europe. Only two small areas in the U. S. Zone have encountered the disease, which

*Received from Colonel Frank A. Todd, Chief of Veterinary Affairs, OMG, U. S. Zone, Germany.

is most fortunate because facilities for producing vaccine are limited.

Fowl plague is present, but is being controlled by quarantine and vaccination.

Rinderpest and contagious pleuropneumonia, which appeared after the last war, are not present on the continent at this time.

The future problems of veterinary medicine in Germany will continue to revolve around the effective control of disease, the improvement of present methods of control, the provision of additional facilities for vaccine production, and the reëstablishment of veterinary schools on a firm basis.

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## Veterinary Officers Separated from Military Service

**Alabama**

Thornton, Grover Cleveland

**Arizona**

King, Jack A.
Olvey, Frank H.

**Arkansas**

Morton, John Denman

**California**

Cranfield, John
Hauge, Ronald T.
Perry, John Kolb
Pike, Burton F.
Townsend, Jay G.
Williams, George A.
McCormick, E. B.

**Colorado**

Jackson, Irvin M.
Miller, G. G., Jr.

**Florida**

Martin, Walter D., Jr.

**Georgia**

Border, Chas. R.
Brock, Jesse C.
Dixon, Albert V.
Lanham, Thomas E.

**Illinois**

Anderson, Everett T.
Harriman, Henry E.
Moody, Robert A.

**Indiana**

Jackson, W. W.

**Iowa**

Brenny, Raymond N.
Clements, James H.
Dykstra, Clarence F.
Hanna, Charles G.
Knoop, Francis W.
Moon, Eugene E.

**Kansas**

Dedrick, Warren J.
Kitselman, Chas. H.
Knox, James W.

**Kentucky**

Metcalfe, Elmer L.
Pass, Albin G.

**Louisiana**

McCurdy, Jon A.
Schofield, William C.

**Michigan**

Stephenson, Dale R.

**Minnesota**

Maher, Martin P.
Wanner, Kasper W.

**Mississippi**

Horne, Charles H.

**Missouri**

Bennett, Ralph W.
Clark, Robert H.
Ebert, Edgar F.
Gouge, Hardin E.
Peck, James E.
Woodhouse, C. A.

**Montana**

Au, Robert J.

**Nebraska**

Spratt, Earl Keith

**Missouri**

Cleveland, H. J.
Fagan, Raymond
Hoy, Lyman Lester
Jennings, Louis
Krukowski, S. M.
Maxwell, Ralph A.
Meisels, Morton
Milici, Rosario F.
Sussman, Oscar
Thomson, Frederic B.
Versluis, Hendrik
White, Wilbur W.

**Ohio**

Burriss, Kenneth K.
Dorgan, William F.
McClarren, R. M.

**Oklahoma**

Fisher, LeRoy T.
Moe, Lewis H.
Zedlitz, Alfred C.

**Pennsylvania**

Cooper, Harold Y.
Evans, Samuel
Jones, Russell C. Jr.
Kolson, Morton
Lerch, Robert J.

**Rhode Island**

Armstrong, James W.

**Texas**

Christian, Paul
Davis, R. H., Jr.
Horning, Jackson G.
Lichnovsky, Jos. F.
Mills, Harold B.
Ozier, Terry Sam
Roberson, Billie C.

**Virginia**

Cooper, Harold K.

**Washington**

Mendenhall, W. I.
Menig, Bert Albert
Todd, Lewis K.

**Address Unknown**

Scott, Rolland O.